

# FH-150R

## SERVICE MANUAL

AEP Model  
UK Model  
E Model



- FH-150R consists of ST-177R, TA-177R, TC-177R and APM-177M.
- Remote commander RM-177R is supplied accessory.

'Dolby' and the double-D symbol are the trade marks of Dolby Laboratories Licensing Corporation. Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

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#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.



**COMPACT HI-DENSITY  
COMPONENT SYSTEM**  
**SONY®**

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## FEATURES

**Compact hi-density component system with simple operation**

Consists of an FM stereo FM-AM tuner, a high quality cassette deck, and an integrated amplifier, each of which can be connected quickly and securely. The functions are switched directly.

**Supplied remote commander for remote control operation**

Allows you to control the whole system from a distance.

**Amplifier with power output of 40 W + 40 W (1 kHz, 5% THD) for AEP, AED, UK models, with peak music power output of 320 W for E, EA3 models**

- Includes a 7-band graphic equalizer controls for fine adjustment of tone quality for both recording and playback, and a 7-band spectrum analyzer.
- Microphone mixing jack and microphone level control.

**High sensitivity and high selectivity tuner**

Permits extremely precise tuning of FM/MW/LW stations (for AEP, AED, UK models) or FM/MW/SW<sub>1</sub>/SW<sub>2</sub> stations (for E, EA3 models) using the electronic digital readout on the frequency display. Five stations on each band can be memorized.

**Auto-reverse cassette deck with select cassette-deck operations**

- B-type and C-type Dolby NR circuit incorporated
- Automatic tape select system
- Automatic music sensor (AMS)
- Automatic recording level control system

**3-way speaker system with APM woofer**

By installing speaker boxes in the appropriate position, the localization of the sound can be arranged to fit your listening situation.

**Newly-developed AMFB (Accurate Motional Feedback) function**

Feeds back movement of Aluminum Honey-comb diaphragm on the speaker to the amplifier as electric signal in order to obtain sufficient bass sounds like a larger speaker system.

# FH-150R      FH-150R

## SPECIFICATIONS

### ST-177R

System FM stereo, FM/AM superheterodyne tuner  
Quartz-locked PLL digital synthesizer system

#### FM tuner section

|                              |                                   |
|------------------------------|-----------------------------------|
| Tuning range                 | 87.5 – 108 MHz                    |
| Antenna                      | Telescopic antenna                |
| Antenna terminals            | 75 ohms unbalanced                |
| Intermediate frequency       | 10.7 MHz                          |
| Usable sensitivity           | 2.3 $\mu$ V (S/N = 30 dB/75 ohms) |
| Signal-to-noise ratio        | 78 dB (mono) 70 dB (stereo)       |
| Harmonic distortion at 1 kHz | 0.2% (mono) 0.5% (stereo)         |
| Separation at 1 kHz          | 40 dB                             |
| Selectivity at 400 kHz       | 55 dB                             |

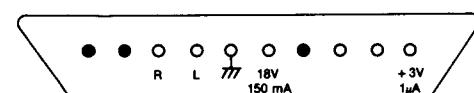
#### MW/LW tuner section (for AEP, AED, UK models)

|                        | MW              | LW  |
|------------------------|-----------------|---|
| Tuning range           | 522 – 1,611 kHz | 144 – 288 kHz   |
| Antenna                |                 | Built-in ferrite bar antenna<br>External antenna terminal |
| Intermediate frequency |                 | 450 kHz   |
| Usable sensitivity     |                 | 250 $\mu$ V/m (999 kHz) 500 $\mu$ V/m (230 kHz)           |
| External antenna       |                 | 100 $\mu$ V (999 kHz) 150 $\mu$ V (230 kHz)               |
| Signal-to-noise ratio  |                 | 52 dB (50 mV/m)   |
| Harmonic distortion    |                 | 0.3% (50 mV/m, 400 Hz)                                    |

#### SW/MW tuner section (for E, EA3 models)

|                        | SW 1                         | SW 2  | MW  |
|------------------------|------------------------------|---|---|
| Tuning range           | 3.2 – 7.3 MHz                | 9.5 – 21.75 MHz   | 531 – 1,602 kHz (at 9 kHz step)<br>530 – 1,610 kHz (at 10 kHz step) |
| Antenna                |                              | Built-in ferrite bar antenna<br>External antenna terminal |   |
| Intermediate frequency |                              | 450 kHz   |   |
| Usable sensitivity     | Built-in ferrite bar antenna | —   | 250 $\mu$ V/m (999 or 1,000 kHz)                                    |
| External antenna       | 23 $\mu$ V (5 MHz)           | 30 $\mu$ V (15 MHz)                                       | 100 $\mu$ V (999 or 1,000 kHz)                                      |
| Signal-to-noise ratio  | 50 dB (5 mV)                 | 52 dB (50 mV/m)   |   |
| Harmonic distortion    | 0.3% (5 mV, 400 Hz)          | 0.3% (50 mV/m, 400 Hz)                                    |   |

#### 10-pin DC input connector of ST-177R



### General

Dimensions Approx. 215 x 55 x 240 mm (w/h/d)  
(8 1/2 x 2 1/4 x 9 1/4 inches)  
incl. projecting parts and controls

Weight Approx. 0.9 kg (2 lb) net

### TC-177R

Recording system 4-track 2-channel stereo  
Frequency response DOLBY NR OFF (DIN)  
With TYPE IV cassettes (Sony METAL-S)  
30–16,000 Hz ( $\pm$ 3 dB)  
With TYPE II cassettes (Sony UCX)  
30–15,000 Hz ( $\pm$ 3 dB)  
With TYPE I cassettes (Sony HF-S)  
30–14,000 Hz ( $\pm$ 3 dB)

Wow and flutter 0.07% WRMS (NAB)  
 $\pm$ 0.2% (DIN)

Dimensions Approx. 215 x 115 x 240 mm (w/h/d)  
(8 1/2 x 4 1/4 x 9 1/4 inches)

Weight Approx. 2.3 kg (5 lb 2 oz) net

13-pin DC input connector of TC-177R



### TA-177R

Continuous RMS power output (AEP, AED, UK models)  
40 + 40 watts (6 ohms, at 1 kHz, 5% THD)  
30 + 30 watts (6 ohms, 40Hz – 20 kHz, 1% THD)

Peak music power output 320 W (6 ohms) (E, EA3 models)

### Inputs

|                      | Sensitivity | Impedance     |
|----------------------|-------------|---------------|
| PHONO (phono jacks)  | 2.5 mV      | 50 kilohms    |
| CD/AUX (phono jacks) | 250 mV      | 50 kilohms    |
| MIC (phone jack)     | 1 mV        | low impedance |

### Outputs

|                                |                                       |
|--------------------------------|---------------------------------------|
| PRE OUT (phono jacks)          | Voltage 250 mV, Impedance 4.7 kilohms |
| HEADPHONES (stereo phone jack) | Accepts headphones of 8 ohms or more  |
| SPEAKER                        | Accepts only the APM-177M             |

Frequency response PHONO: RIAA curve  $\pm$  0.5 dB

CD/AUX 40 Hz – 30 kHz  $^{+0}_{-3}$  dB

MIC: 100 Hz – 10 kHz  $^{+0}_{-3}$  dB

Dimensions Approx. 215 x 115 x 235 mm (w/h/d)  
(8 1/2 x 4 1/2 x 9 1/4 inches)

Weight incl. projecting parts and controls  
Approx. 4.5 kg (9 lb 15 oz) net

### APM-177M

Speaker system 3 way speaker system  
Speaker units Woofer: 110 cm<sup>2</sup> APM type  
Tweeter: 5 cm dia, cone type  
Super tweeter: 3.5 cm dia, cone type

Enclosure type Bass reflex  
Frequency range 30 Hz – 20 kHz (AMFB switch ON)  
60 Hz – 20 kHz (AMFB switch OFF)

Sensitivity 90 dB/W/m

Impedance 6 ohms

Dimensions Approx. 170 x 280 x 220 mm (w/h/d)  
(6 1/2 x 10 1/2 x 8 1/4 inches)

Weight Approx. 3.1 kg (6 lb 14 oz) net per speaker

### General

Power requirements AEP, AED models: 220 V AC, 50/60 Hz  
UK model: 240 V AC, 50Hz  
E, EA3 models: 120, 220 or 240 V AC  
adjustable, 50/60 Hz

Power consumption 90 watts

Dimensions Approx. 570 x 345 x 230 mm (w/h/d)  
(22 1/2 x 13 3/4 x 9 1/4 inches)

Weight incl. projecting parts and controls  
Approx. 14.6 kg (32 lb 3 oz) net  
Approx. 16.4 kg (36 lb 3 oz) in shipping carton

## MODEL IDENTIFICATIONS

TC-177R has no difference by the model.

### ST-177R

### SONY MODEL NO. ST-177R

#### FM STEREO/FM-AM TUNER

#### FREQUENCY RANGE:

IF: FM 10.7 MHz AM 450 kHz

SERIAL NO.  
MADE IN JAPAN

FM: 87.5 – 108 MHz SW<sub>2</sub>: 9.5 – 21.75 MHz } E, Saudi Arabia  
SW<sub>1</sub>: 3.2 – 7.3 MHz MW: 531 – 1,602 kHz } models

FM: 87.5 – 108 MHz MW: 522 – 1,611 kHz LW: 144 – 288 kHz } AEP, Denmark  
G-AEP, UK models

BLANK ..... E, E<sub>3</sub> models  
E<sub>2</sub> ..... E<sub>2</sub> model

### SONY MODEL NO. APM-177M

#### SPEAKER SYSTEM

#### IMPEDANCE:

SERIAL NO.  
MADE IN JAPAN

BLANK ..... E<sub>2</sub>, E<sub>3</sub> models  
POWER HANDLING CAPACITY: 40W (NOM) .... E model  
80W (MAX)

### TA-177R

### SONY MODEL NO. TA-177R

#### INTEGRATED STEREO AMPLIFIER

AC: [Hatched area]

SERIAL NO.  
MADE IN JAPAN

220V ~ 50/60Hz 90W ..... models  
240V ~ 50Hz 170W ..... UK model  
120/220/240V ~ 50/60Hz 90W ..... E<sub>2</sub>/E<sub>3</sub>, Saudi Arabia models

#### G-AEP

• This label is stucked on TA-177R (G-AEP model).

### SONY MODEL NO. FH-150R

#### COMPACT HI-DENSITY COMPONENT SYSTEM

ST-177R: FM STEREO/FM AM TUNER

TA-177R: INTEGRATED STEREO AMPLIFIER

TC-177R: STEREO CASSETTE DECK

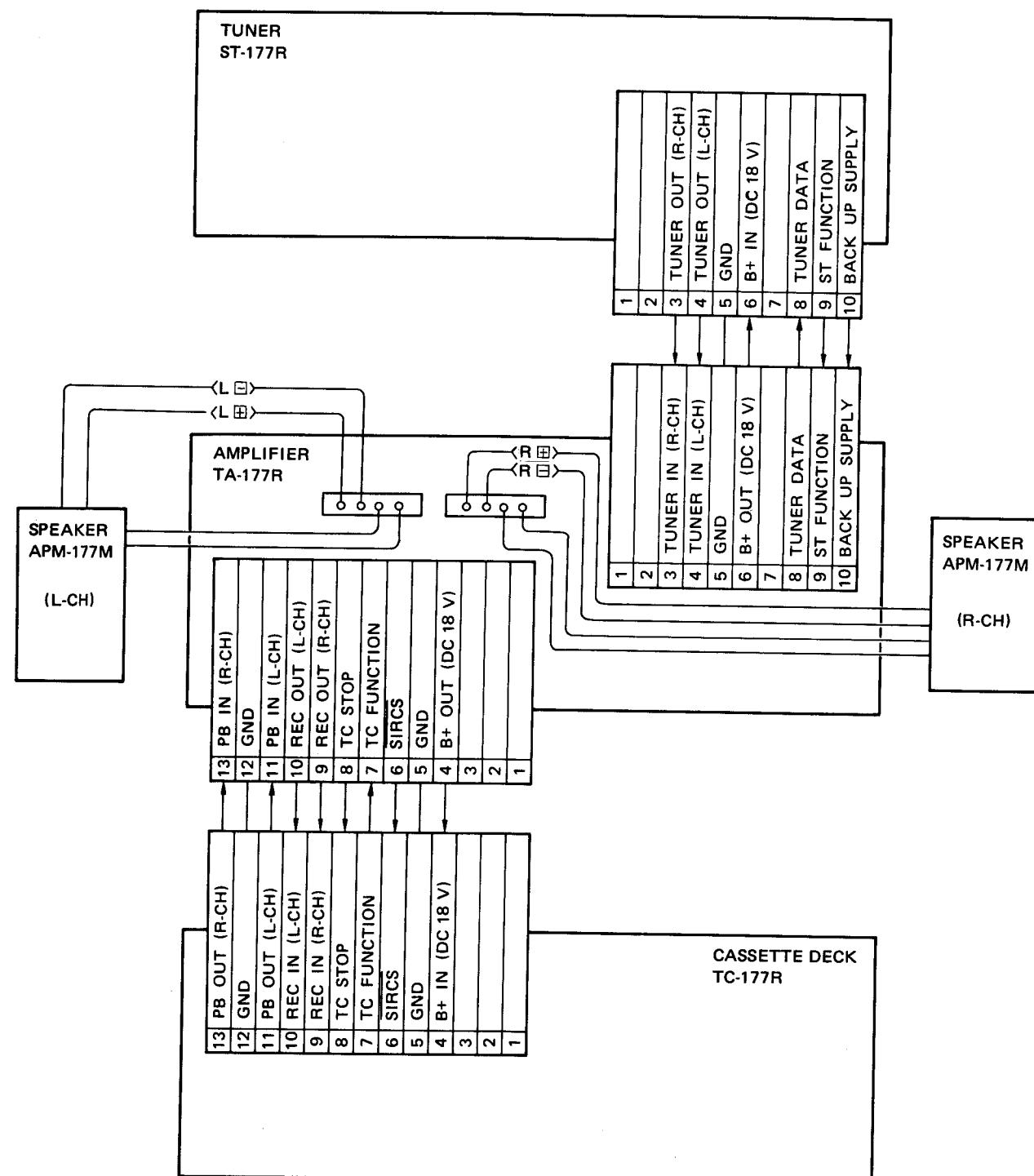
APM-177M: SPEAKER SYSTEM

AC: 220V ~ 50/60Hz 90W

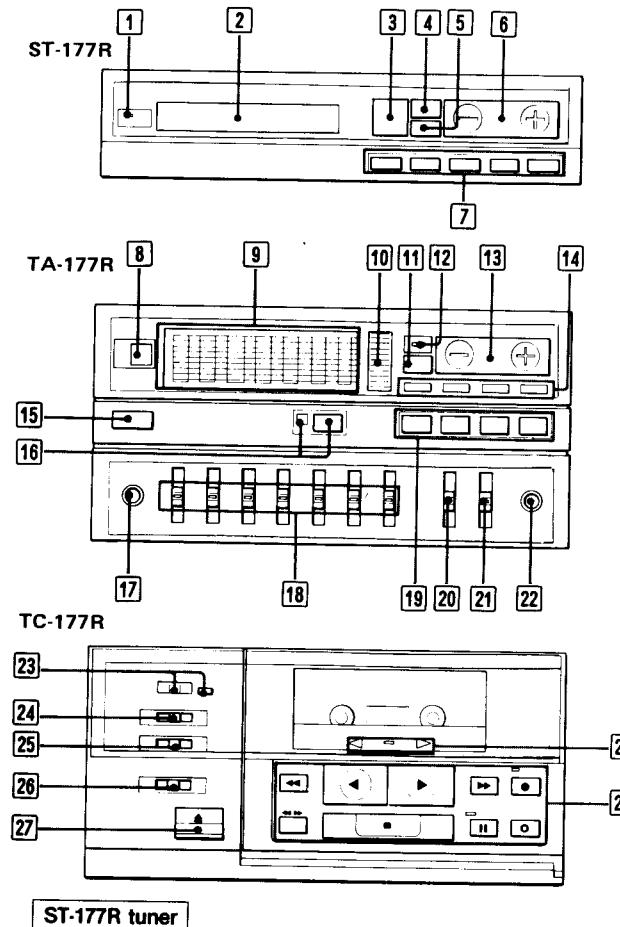
[Hatched area]  
FTZ  
31/585S

SERIAL NO.  
MADE IN JAPAN

CONNECTION BETWEEN EACH SET



FUNCTION OF CONTROLS



- STEREO indicator**  
Lights when an FM stereo program of sufficient signal strength is tuned in.
- Band/frequency display**  
Displays the frequency received and the following items. When the PRESET button is pressed, the button number appears. When a signal is tuned in, the TUNED indicator appears. When the MEMORY button is pressed, the MEMORY indicator appears.
- BAND select button**  
Press to select the desired band. The band indicator appears in the display. With each press, the band changes as follows.  
AEP, AED, UK models: FM → MW → LW  
E, EA3 models: FM → SW<sub>2</sub> (SW 9.50–21.75MHz) → SW<sub>1</sub> (SW 3.20–7.30MHz) → MW
- STEREO MUTING button**  
This button serves the dual purpose of a mode and FM muting button. Normally keep this button engaged (the MUTING indicator appears) to eliminate FM interstation noise while tuning from station to station. The tuner operates in stereo mode for stereo sound sources and will be automatically switched to mono mode for monaural sound sources.
- MEMORY button**  
Press to memorize a tuned-in station on a PRESET button.

- TUNING button**  
Press the "+" side to tune in a higher frequency, and the "-" side to tune in a lower frequency. To change the frequency rapidly, keep the button pressed.
- PRESET buttons**  
Press the appropriate button to memorize a tuned-in station or to call up a memorized station.
- TA-177R amplifier**
- REMOTE SENSOR**  
Receives the infrared ray command transmitted from the supplied RM-177R remote commander.
- 7 BAND SPECTRUM ANALYZER display**  
This is a 7-division real time analyzer, and the frequency band is the same as that of the graphic equalizer.
- VOL LEVEL (volume level) indicator**  
Indicates the output level of the amplifier.
- MUTING button**  
Press to reduce the sound level by 20 dB. Press again to restore the same listening level as before. This function is useful when you lower the tonearm onto a record or when you answer the telephone.
- Muting indicator**  
Lights when the MUTING button is pressed.
- VOLUME control**  
Press the "+" side to increase the overall sound level, or the "-" side to decrease it.
- Function indicators**  
The indicator lights to show the audio input source in use. When the power is turned on, the tuner indicator lights.
- POWER switch**  
Depress (△ ON) to turn on the power of the stereo system. To turn it off, press again (□ OFF).
- AMFB (Accurate Motional Feedback) switch and indicator**  
Depress when reinforcing bass sounds. The indicator lights up. This function will not work unless both the right and left speakers are connected. Also, this function will not work in case you are listening with headphones. Then, the indicator will go out.
- HEADPHONES jack (stereo phone jack)**
- GRAPHIC EQUALIZER controls**  
Slide each control upwards to increase the level of the frequency band, and downwards to decrease the level.  
63 Hz: Use to boost or cut heavy bass.  
150 Hz: Use to boost or cut normal bass.  
400 Hz: Use to adjust the power, spaciousness and warmth of the sound.  
1 kHz: Use to provide more presence for vocals.  
3 kHz: Use to boost a brighter sound and to reduce stridency.  
6 kHz: Use to adjust the brightness of sound.  
14 kHz: Use to adjust the treble.

To record or listen to the sound with the original tone quality, set all the controls at their center positions.

**[19] FUNCTION select buttons**

Select the desired button for program source.

**TAPE:** For listening to a taped program.

**CD/AUX:** For listening to or record a compact disc or auxiliary program source connected to CD/AUX inputs.

**TUNER:** For listening to or record a radio program.

**PHONO:** For listening to or record a record program source connected to PHONO inputs.

To select a tuner program, press any button of the tuner except MEMORY and STEREO MUTING buttons.

To select a taped program, set the cassette deck in playback mode.

**[20] BALANCE control**

Adjusts the balance of the left and right channel output levels.

**[21] MIC LEVEL (microphone level) control**

Controls the input level of the microphone.

Slide towards MAX to increase microphone level and towards MIN to decrease it.

When not in use of microphone mixing, set this control to the MIN position.

**[22] MIC (microphone) jack (phone jack)**

Connect a microphone for microphone mixing.

**TC-177R cassette deck****[23] TAPE COUNTER and reset button**

The tape counter provides a numerical reference point. To reset to zero, press the reset button.

**[24] DOLBY NR switch**

Select the Dolby NR\* (Noise Reduction) system to be used for recording or playback.

**OFF:** To record or play back without the Dolby NR process.

**B:** To record or play back with the Dolby B-type NR process.

**C:** To record or play back with the Dolby C-type NR process.

\*Dolby and the double -D symbol are trade marks of the Dolby Laboratories Licensing Corporation. Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

**[25] DIRECTION MODE selector**

Select the mode of tape transport for recording and playback.

→ : To record or play back one side of a cassette.

↔ : To record on both sides of a cassette or to repeat playback of both sides endlessly.

**[26] TIMER standby switch**

Normally set to OFF. To start recording or playback automatically using an optional timer, set to REC or PLAY.

**[27] ▲ EJECT (eject) button**

Press to open the cassette holder.

**[28] Tape transport direction mode indicators****[29] Tape operation mode select buttons**

◀ (fast reverse)/AUTO PLAY ▶ button

**AMS (Automatic Music Sensor) button and indicator:**

Press to activate the AMS function. The indicator lights.

To deactivate that function, press again.

◀ (reverse play) button

■ (stop) button ▶ (play) button

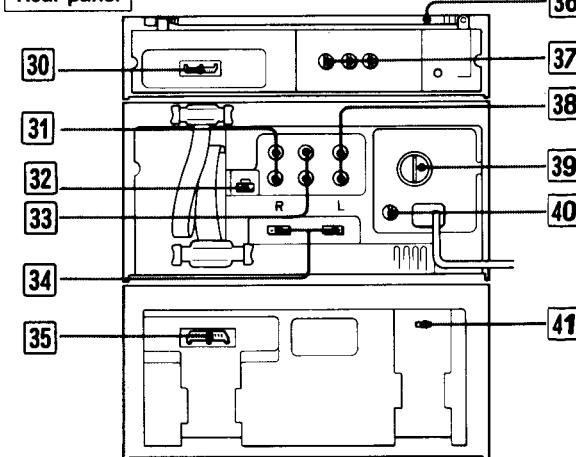
▶ (fast forward)/AUTO PLAY □ button

**II PAUSE button and indicator:** Press to stop the tape

momentarily during recording or playback. To disengage pause mode, press again. The indicator lights during pause and flickers just after the power is turned on and during record muting.

**O (record muting) button:** Press to eliminate unwanted program material such as broadcasting commercials during recording.

**● REC (record) button and indicator:** To start recording keeping this button pressed, press the □ or ▶ buttons

**Rear panel**

**[30] Power connector of tuner**

**[31] PHONO inputs (phono jacks)**

Accepts the outputs of a turntable system.

**[32] CONTROL S OUT connector (4-pin)**

Connect the supplied CD player connecting cord to this connector to control the compact disc player from a remote location.

**[33] CD/AUX (compact disc/auxiliary) inputs (phono jacks)**

Accepts the outputs of a compact disc player or input sources such as a playback only tape deck.

**[34] Speaker terminals**

**[35] Power connector of tape deck**

**[36] Telescopic antenna**

Used for FM or SW (only for E, EA3 models) reception.

**[37] FM/LW/MW external antenna terminals (AEP, AED, JK models) / FM/SW/MW external antenna terminals (E, EA3 models)**

**[38] PRE OUT outputs (phono jacks)**

Accepts the line inputs of a tape deck for tape recording. Recording the sound adjusted with the GRAPHIC EQUALIZER controls or the microphone sound mixed with sources can be made.

**[39] VOLTAGE SELECTOR (only for E, EA3 models)**

**[40] Ground terminal (only for West Germany and Italy)**

**[41] ISS (interference suppress switch)**

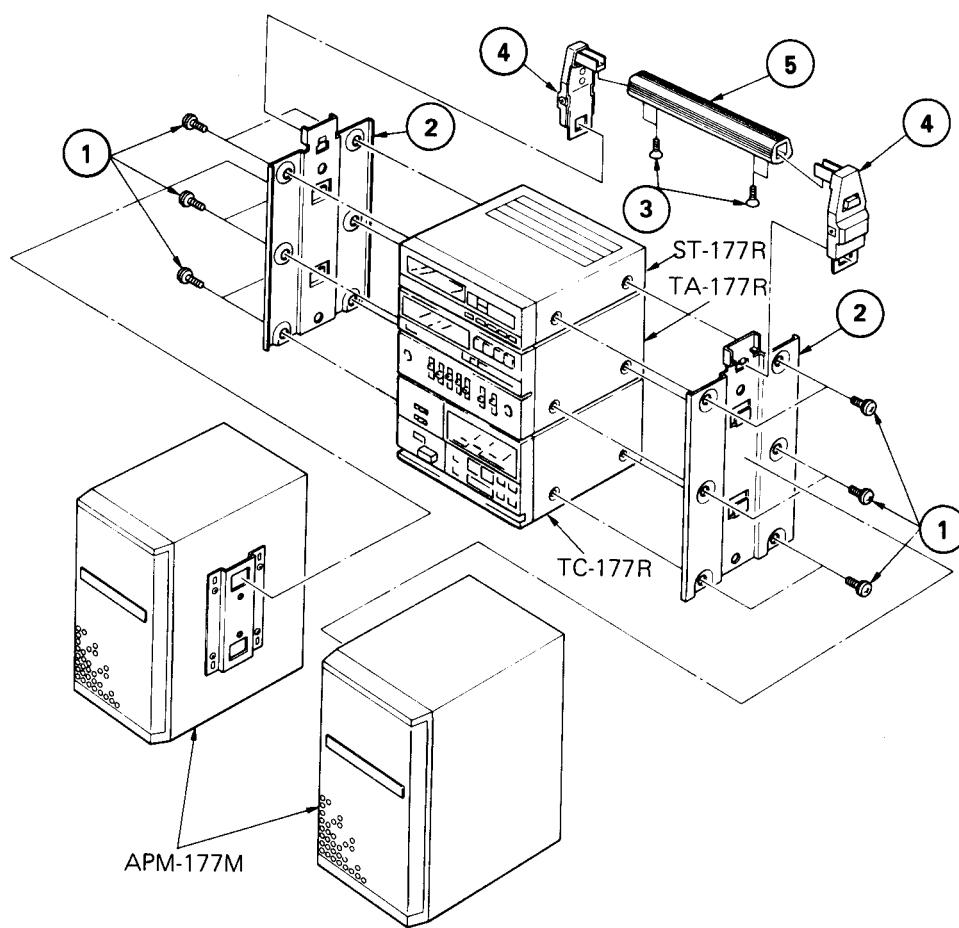
If interference is encountered while recording MW or LW program, slide the switch to position 1, 2 or 3 depending on which best reduces the noise.

## EXPLODED VIEW AND PARTS LIST

## NOTE:

The mechanical parts with no reference number in the exploded views are not supplied.

Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

GENERAL SECTION

| No. | Part No.     | Description                |
|-----|--------------|----------------------------|
| 1   | X-4902-909-1 | SCREW ASSY, SIDE PLATE     |
| 2   | 4-910-051-11 | PLATE (C), SIDE            |
| 3   | 7-685-247-29 | SCREW +KTP 3X10 TYPE2 SLIT |
| 4   | X-4910-069-1 | BRACKET ASSY, HANDLE       |
| 5   | 2-249-402-01 | HANDLE                     |

ACCESSORY & PACKING MATERIAL

| Part No.      | Description                               |
|---------------|---|
| 1-463-732-11  | REMOTE COMMANDER (RM-177R)                |
| 1-556-372-61  | CORD, CONNECTION (4 CORE)                 |
| 3-701-630-00  | BAG, POLYETHYLENE                         |
| 3-765-098-11  | (EXCEPT FOR G-AEP)...MANUAL, INSTRUCTION  |
| 3-765-098-41  | (AEP,G-AEP,Denmark)...MANUAL, INSTRUCTION |
| *4-603-394-00 | CUSHION (A)(RM-177R)                      |
| 4-884-945-00  | PARTITION                                 |

ACCESSORY & PACKING MATERIAL

| Part No.     | Description                                |
|--------------|--|
| 4-872-911-00 | (TC-177R)...SHEET, PROTECTION              |
| 4-872-911-00 | (TA-177R)...SHEET, PROTECTION              |
| 4-884-884-00 | (ST-177R)...SHEET, PROTECTION              |
| 4-910-323-01 | (APM-177M)...SHEET, PROTECTION             |
| 4-907-610-01 | JOINT                                      |
| 4-910-052-01 | CUSHION (FRONT), UPPER                     |
| 4-910-053-01 | CUSHION (REAR), UPPER                      |
| 4-910-054-01 | CUSHION (FRONT), LOWER                     |
| 4-910-055-01 | CUSHION (REAR), LOWER                      |
| 4-910-353-01 | (APM-177M)...CUSHION, UPPER                |
| 4-910-324-01 | (APM-177M)...CUSHION, LOWER                |
| 4-914-346-21 | (E2/3,Saudi Arabia).....INDIVIDUAL CARTON  |
| 4-914-346-31 | (AEP,G-AEP,UK,Denmark)...INDIVIDUAL CARTON |
| 9-911-842-XX | CUSHION (F)                                |
| X-4902-908-1 | BAG ASSY, SCREW                            |

# FM STEREO/FM-AM TUNER [ST-177R]

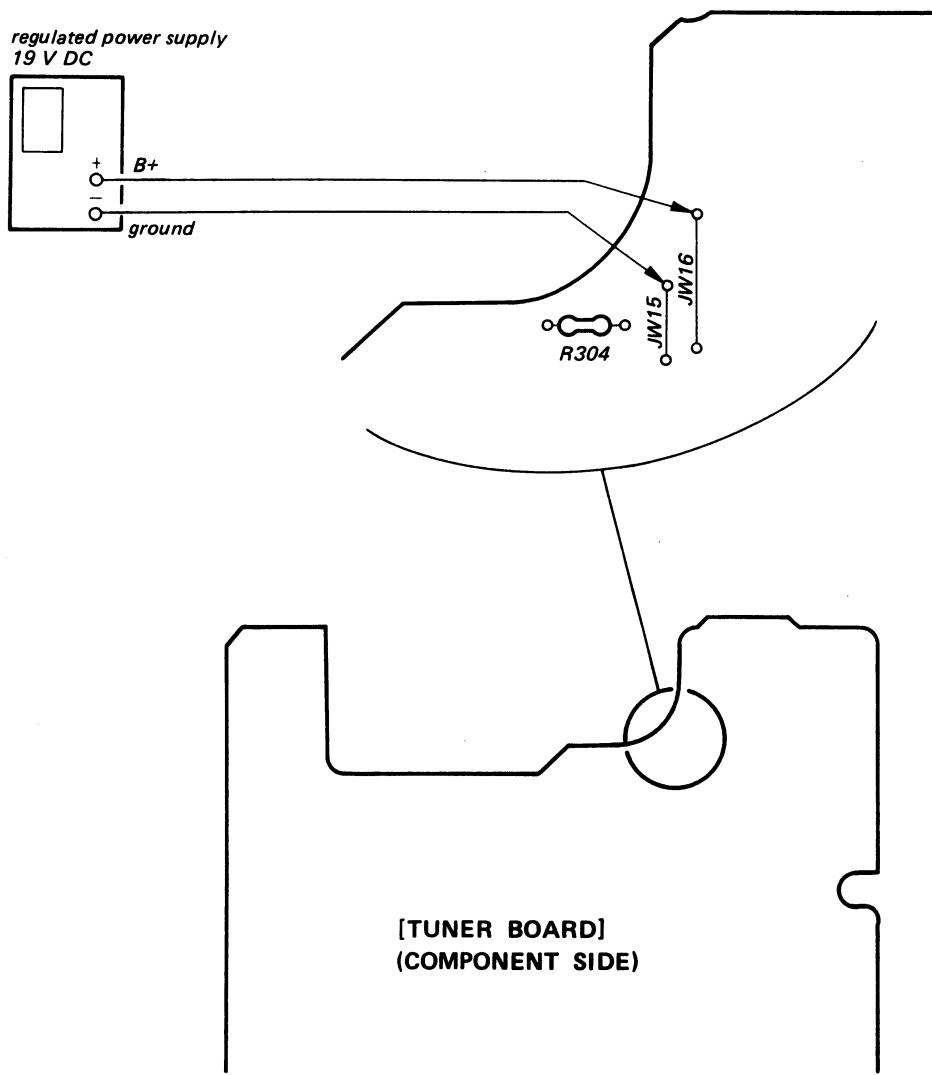
(AEP, UK model)

## **REPAIRING PRECAUTION**

[To apply B+ voltage]

The power of this unit is fed from TA-177R.

Because of this, connect the regulated power supply as illustrated below when this unit alone operates.



**FH-150R  
ST-177R**

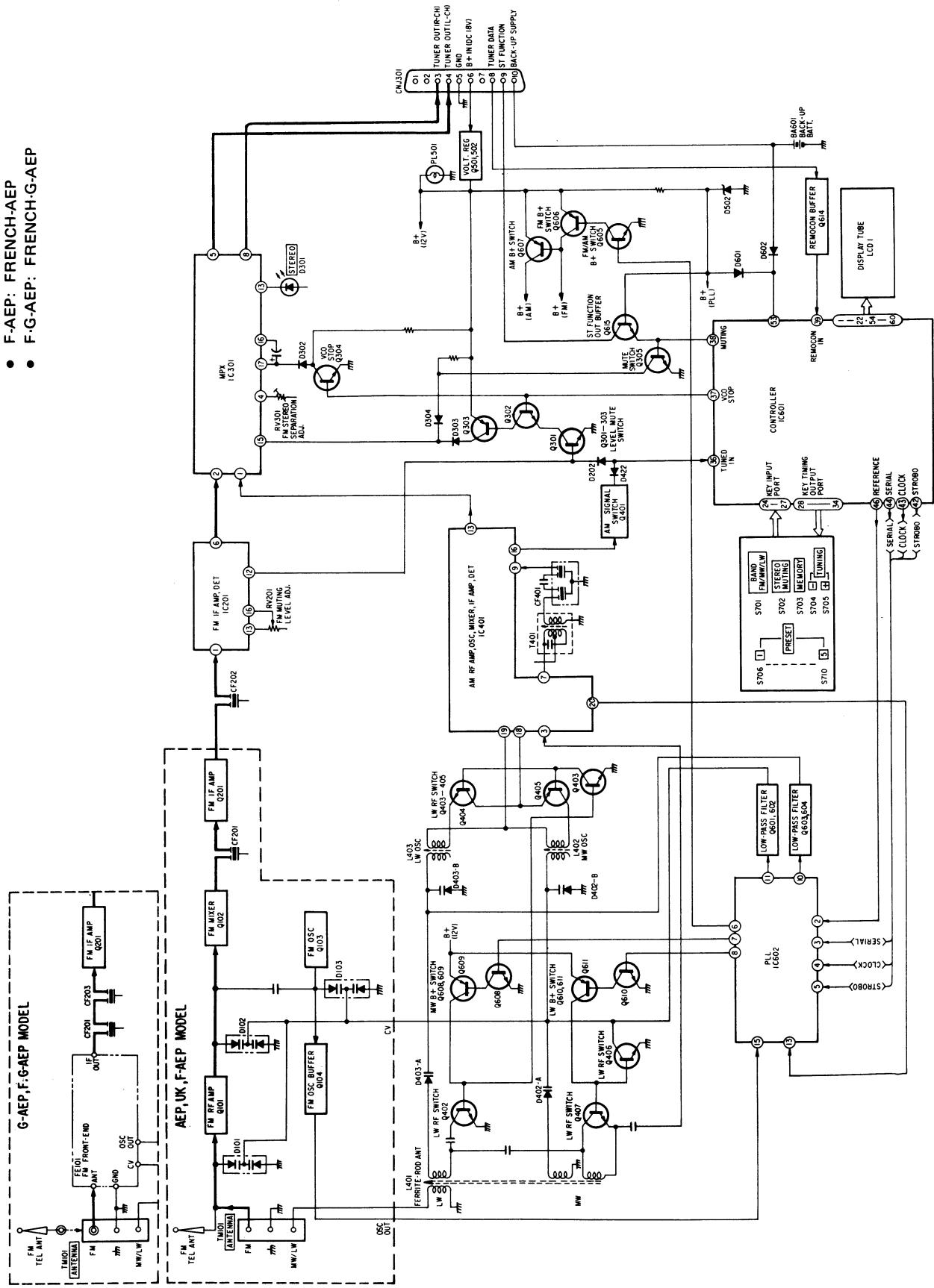
(AEP, UK model)

SECTION 1

## BLOCK DIAGRAM

**Note:**

- F-AEP: FRENCH-AEP
- F-G-AEP: FRENCH-G-AEP



**SECTION 2**  
**ADJUSTMENTS**

(AEP, UK model)

**FH-150R**  
**ST-177R**

**FH-150R**  
**ST-177R**

(AEP, UK model)

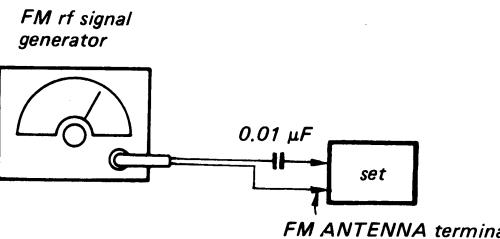
**FM SECTION 1**

**Setting:**

BAND selector switch . . . FM

**FM OSC Voltage Adjustment**

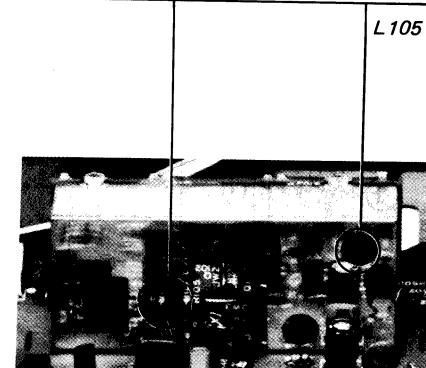
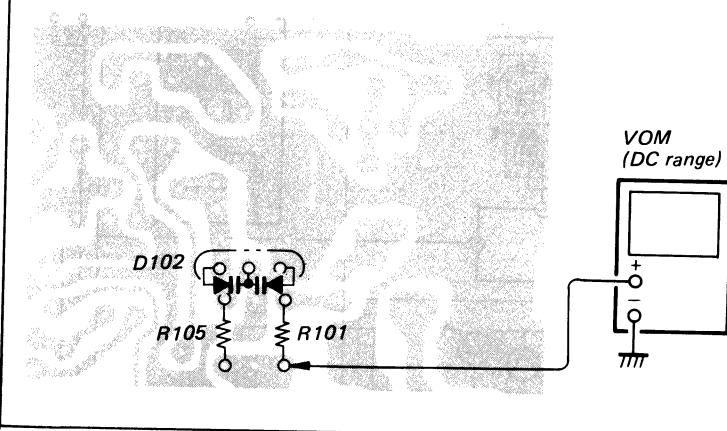
**Setting:**



**Procedure:**

1. Push the TUNING (+, -) button for 108 MHz.
2. Adjust L105 for 8.9 – 9 V reading on the VOM.

**[FE BOARD] (CONDUCTOR SIDE)**



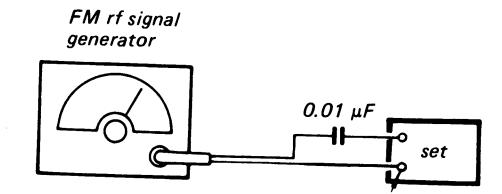
*FE board*

**G-AEP, F-G-AEP Model:**

*The FM front-end is carefully adjusted at the factory and is supplied as one whole block for replacement.*

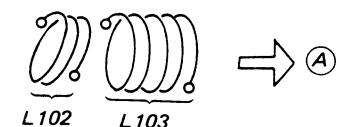
**FM Tracking Adjustment  
(Except for G-AEP, F-G-AEP model)**

**Setting:**



**Procedure:**

1. Push TUNING (+, -) button for 98 MHz.
2. Approach L102 and L103 not to contact each other.
3. Adjust L101 and L103, and repeat the adjustment 2 – 3 times for maximum VTVM reading.  
 ( Adjust L103 in the direction as shown by arrow *A*. )



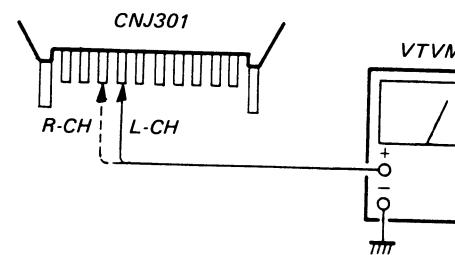
**Note:** Do not touch L102.  
 • F-G-AEP: FRENCH-G-AEP

*L101*

*L102*

*L103*

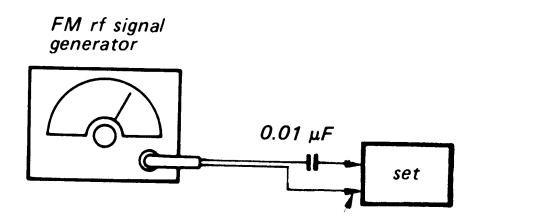
*FE board*



**Note:** FM discriminator alignment should be made after FM tracking adjustment.

**FM Discriminator Alignment (NULL Check)**

**Setting:**

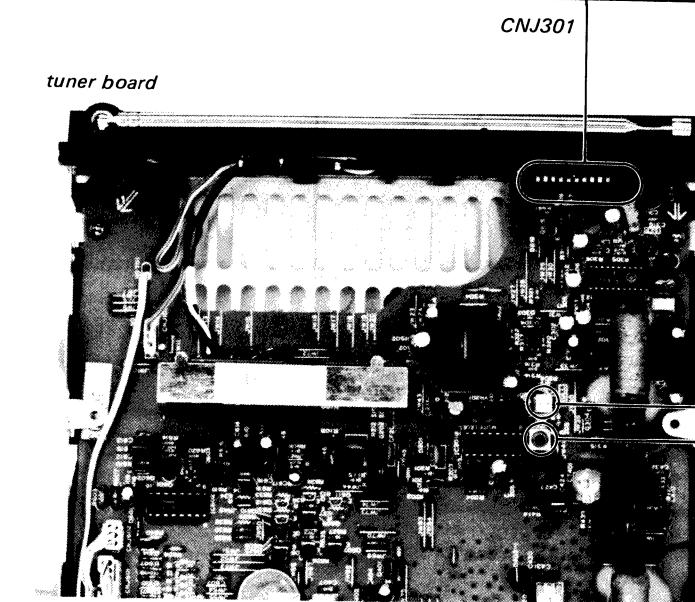


*VOM (DC range)*

- Procedure:**
1. Push the TUNING (+, -) button for 98 MHz.
  2. Adjust T201 for 0 V reading on the VOM.

**Note:**

- F-AEP: FRENCH-AEP
- F-G-AEP: FRENCH-G-AEP



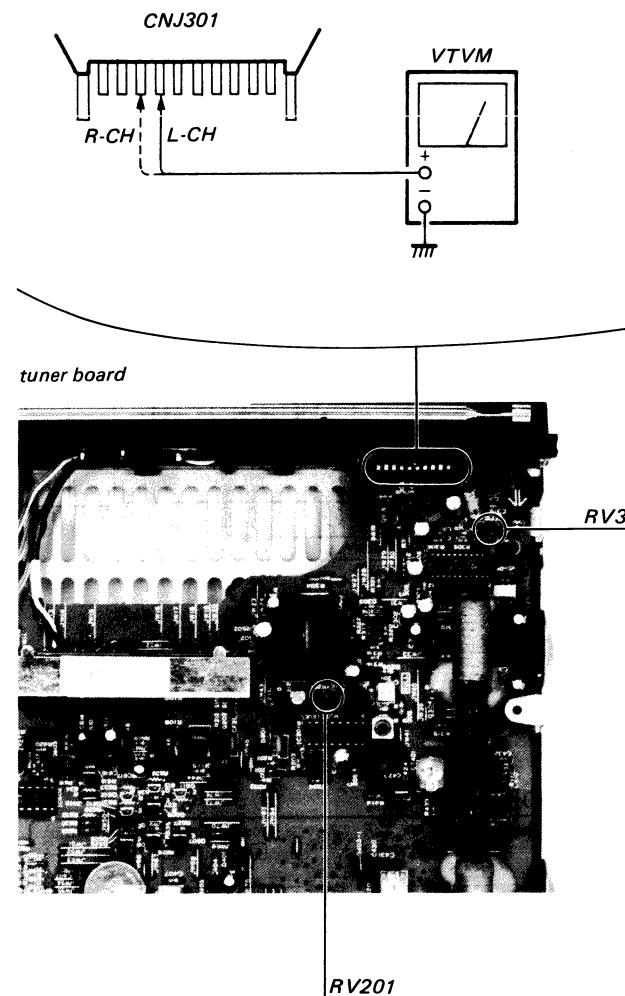
*CNJ201*

*T201*

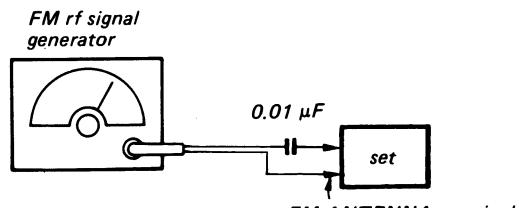
(AEP, UK model)

**FH-150R  
ST-177R****FH-150R  
ST-177R**

(AEP, UK model)

**FM SECTION 2****FM Muting Level Adjustment****Setting:**

STEREO MUTING switch . . . ON

**Procedure:**

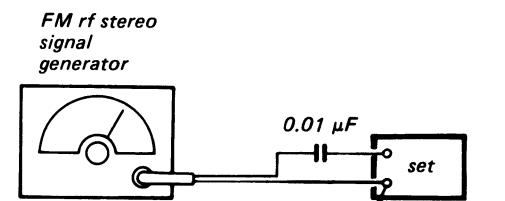
**Carrier frequency:** 98 MHz  
**Modulation:** 1 kHz, 75 kHz deviation (AEP, UK, F-AEP model)  
 1 kHz, 40 kHz deviation (G-AEP, F-G-AEP model)  
**Output level:** 17.9  $\mu$ V (25 dB)

- Push the TUNING (+, -) button for 98 MHz.
- Adjust RV201 for a point the VTVM reading just drops to 0 V.

**Note:**  
 • F-AEP: FRENCH-AEP  
 • F-G-AEP: FRENCH-G-AEP

**FM Stereo Separation Adjustment****Setting:**

STEREO MUTING switch . . . ON

**Procedure:**

**Carrier frequency:** 98 MHz  
**Modulation:** audio (1 kHz):  
 33.75 kHz deviation (AEP, UK, F-AEP model)  
 20 kHz deviation (G-AEP, F-G-AEP model)  
**pilot (19 kHz):** 7.5 kHz deviation  
**sub-channel (38 kHz):**  
 33.75 kHz deviation (AEP, UK, F-AEP model)  
 20 kHz deviation (G-AEP, F-G-AEP model)  
**Output level:** Mode: 1 mV (60 dB) stereo

| FM stereo signal generator output channel | VTVM connection | VTVM reading (dB)                 |
|---|-----------------|-----------------------------------|
| L-CH                                      | L-CH            | (A)                               |
| R-CH                                      | L-CH            | Adjust RT301 for minimum reading. |
| R-CH                                      | R-CH            | (C)                               |
| L-CH                                      | R-CH            | (D)                               |

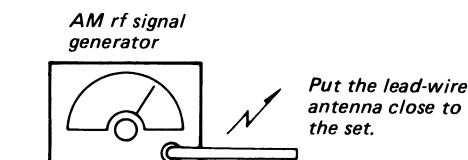
L-CH Stereo separation: (A) – (B)  
 R-CH Stereo separation: (C) – (D)

The separations of both channels should be equal.

- Note:**  
 • F-AEP: FRENCH-AEP  
 • F-G-AEP: FRENCH-G-AEP

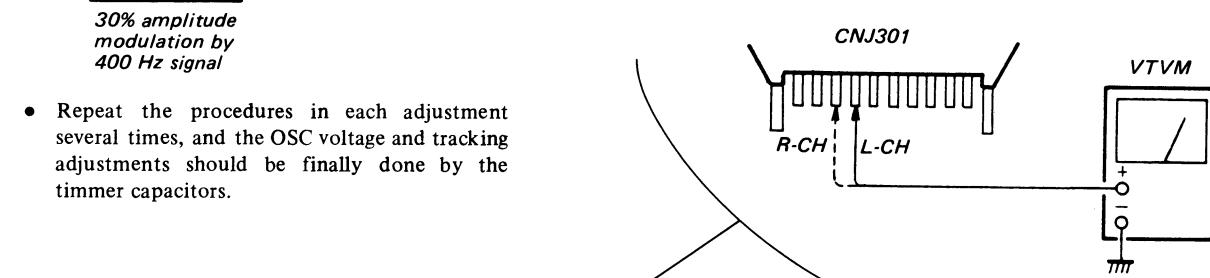
**AM SECTION****Setting:**

BAND selector switch: MW or LW



30% amplitude modulation by 400 Hz signal

- Repeat the procedures in each adjustment several times, and the OSC voltage and tracking adjustments should be finally done by the timer capacitors.

**AM IF ALIGNMENT**

Adjust for a maximum reading on VTVM.

T401 450 kHz

**LW TRACKING ADJUSTMENT**

Adjust for a maximum reading on VTVM.

L401 170 kHz

CT403 310 kHz

**Note:** MW tracking adjustment should be made after LW tracking adjustment.

**MW TRACKING ADJUSTMENT**

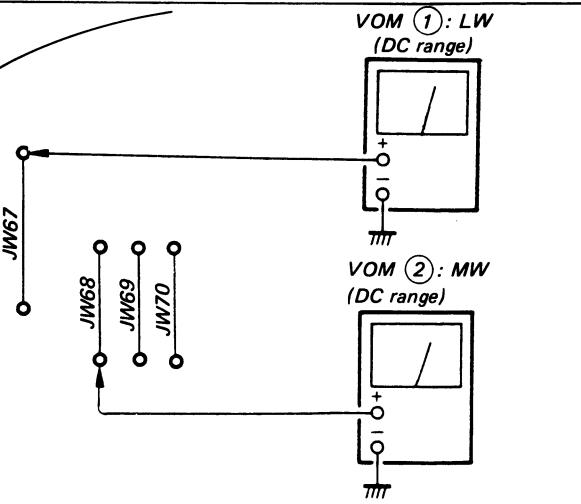
Adjust for a maximum reading on VTVM.

CT401 1,404 kHz

L401 603 kHz

**MW/LW OSC Voltage Adjustment****Procedure:**

- Set BAND selector switch to MW.
- Push TUNING (+, -) button for 531 kHz. Adjust L402 for 0.95 – 1.05 V VOM ② reading.
- Push the button for 1,602 kHz. Adjust CT402 for 8.9 – 9.0 V VOM ② reading.
- Set BAND selector switch to LW.
- Push TUNING (+, -) button for 153 kHz. Adjust L403 for 0.95 – 1.05 V VOM ① reading.
- Push the button for 344 kHz. Adjust CT404 for 8.9 – 9.0 V VOM ① reading.



## 3-1. MOUNTING DIAGRAM

—Conductor Side—

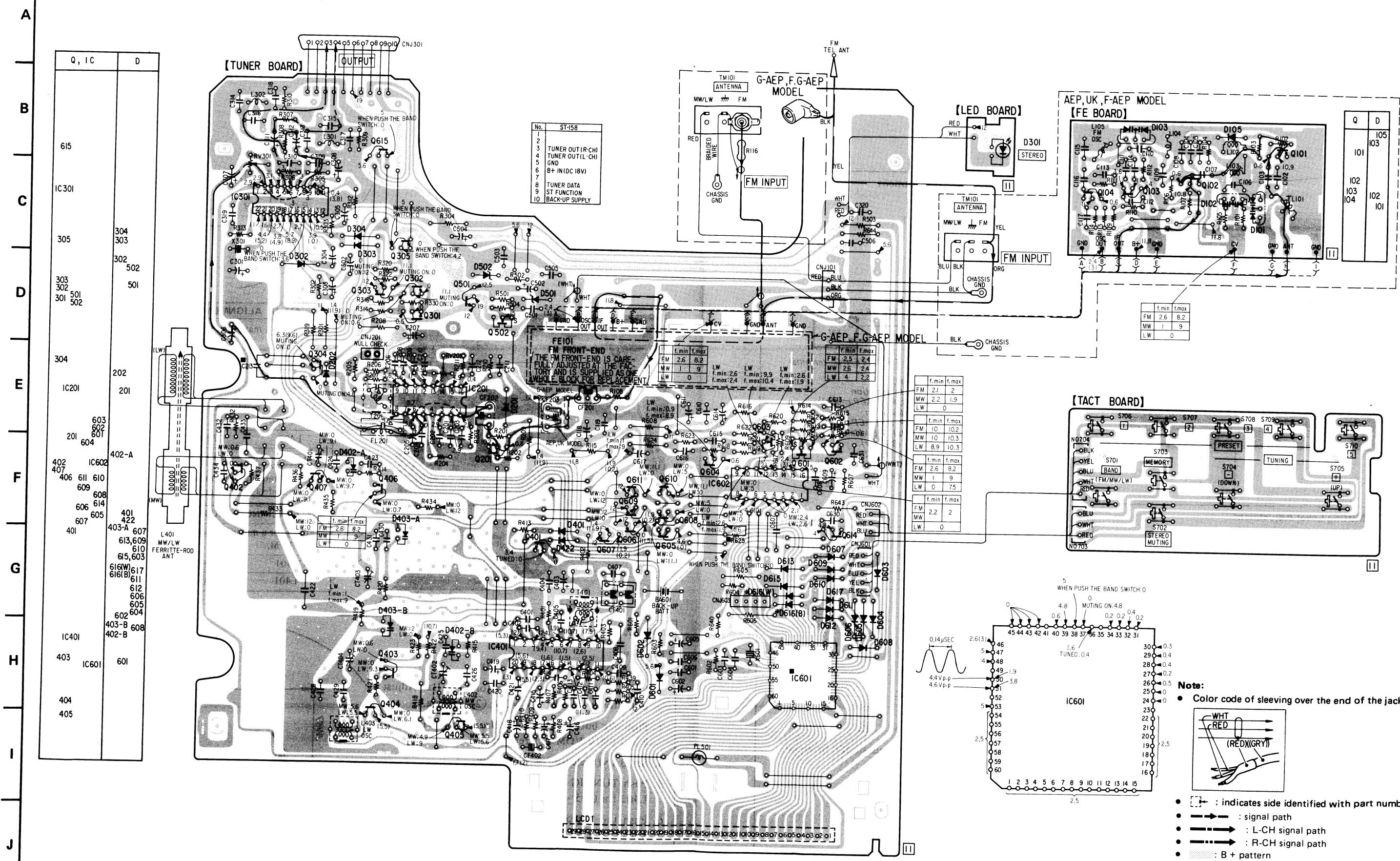
SECTION 3  
DIAGRAMS

(AEP, UK model)

FH-150R  
ST-177RFH-150R  
ST-177R

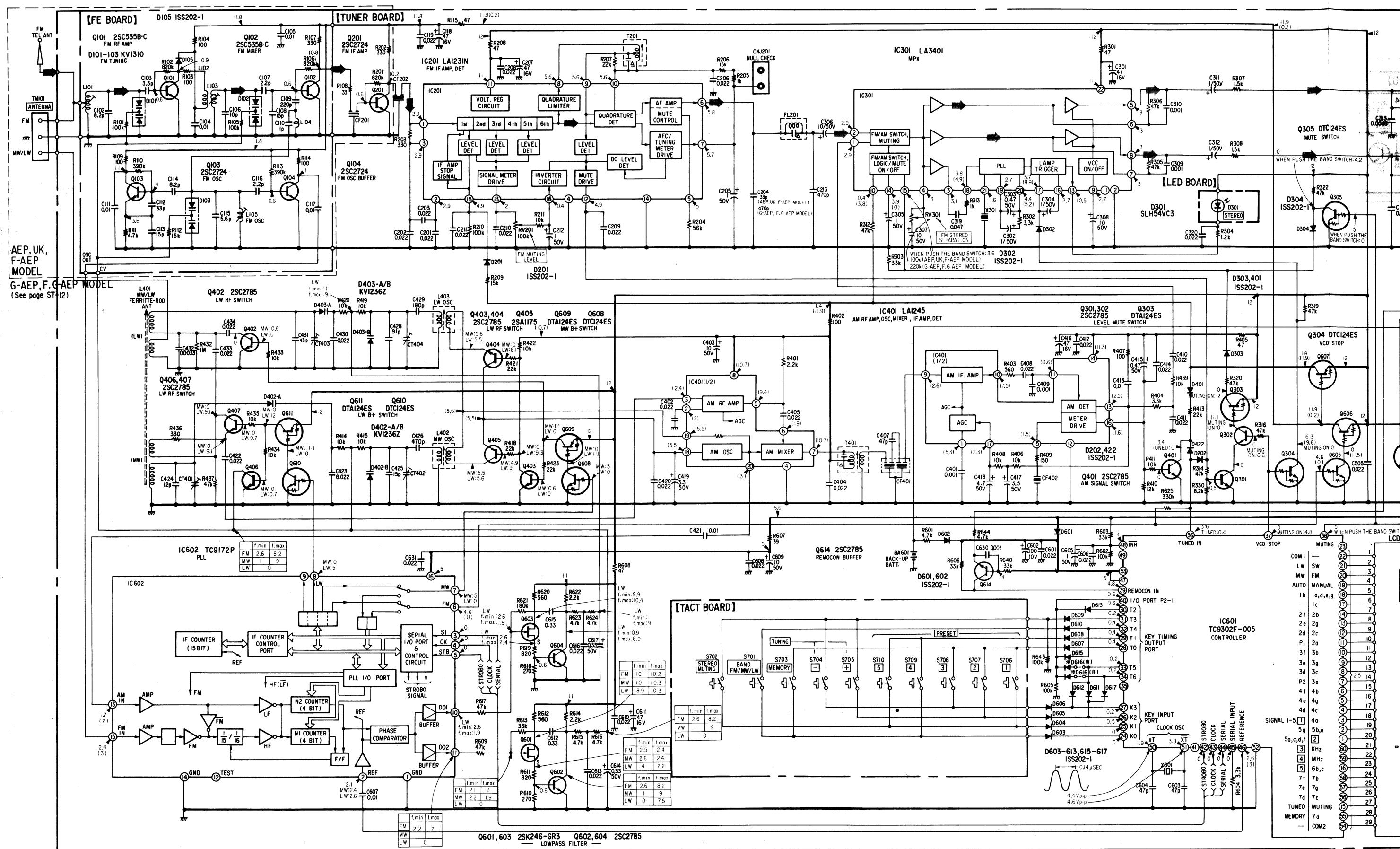
(AEP, UK model)

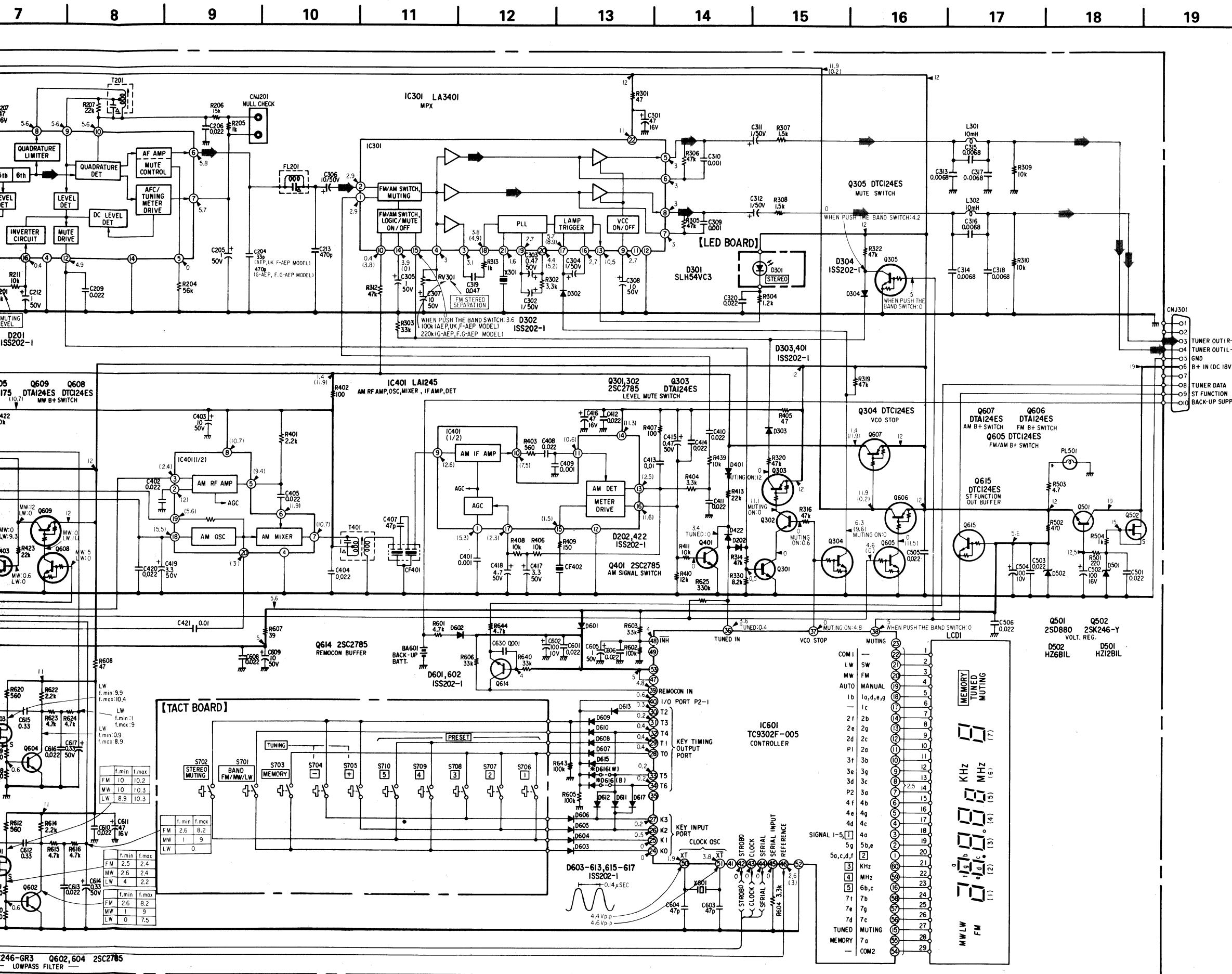
- Refer to page ST-12 for Semiconductor Lead Layouts.



### **3-2. SCHEMATIC DIAGRAM**

**1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16**



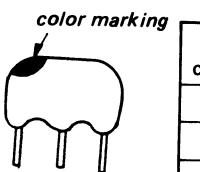


## Note:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\mu\text{F}$  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4\text{ W}$  or less unless otherwise specified.
- : signal path.
- : internal component.
- : B+ bus.
- : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under detuned conditions with a VOM (50  $k\Omega/\text{V}$ ).
- no mark: FM  
( ): AM
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in detuned mode by using oscilloscope. Voltage variations may be noted due to normal production tolerances.
- F-AEP: FRENCH-AEP
- F-G-AEP: FRENCH-G-AEP

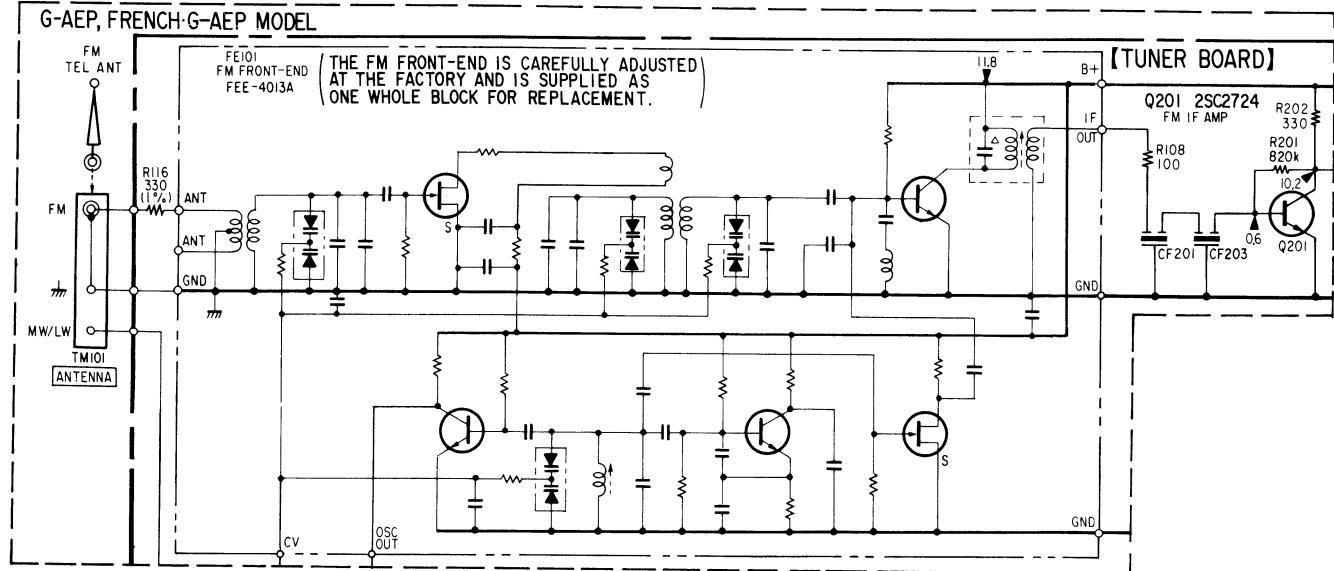
\* : When replacing ceramic filters CF201, 202 and CF203 (G-AEP model), color marking on their bodies should be the same.

Connect or remove D616 according to color marking of ceramic filters.

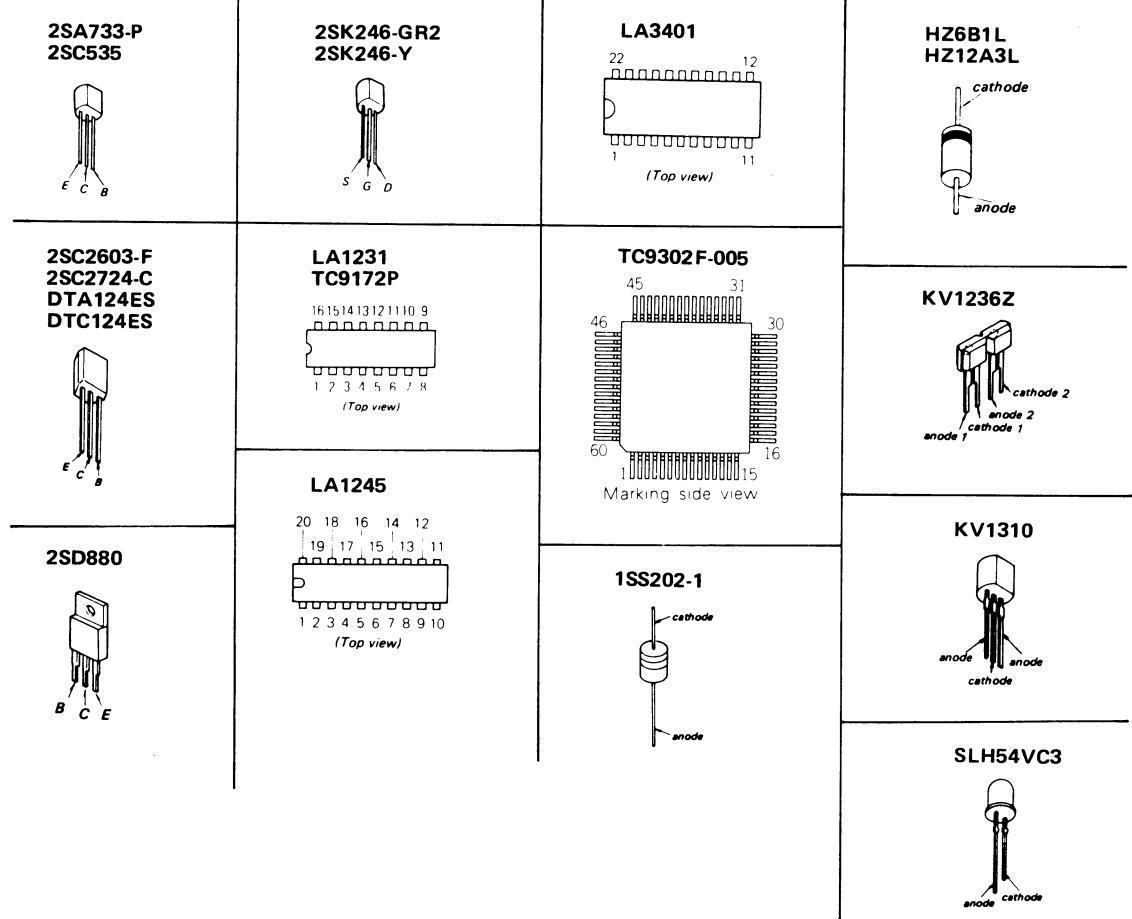


| CF201 – 203<br>color marking | D616                |
|------------------------------|---------------------|
| black                        | D616 (B), connected |
| red                          | not connected       |
| white                        | D616 (W), connected |

## 3-3. FM FRONT-END SCHEMATIC DIAGRAM (G-AEP, FRENCH-G-AEP MODEL)



## ● Semiconductor Lead Layouts



## SECTION 4 (AEP, UK model)

## EXPLODED VIEWS AND PARTS LIST

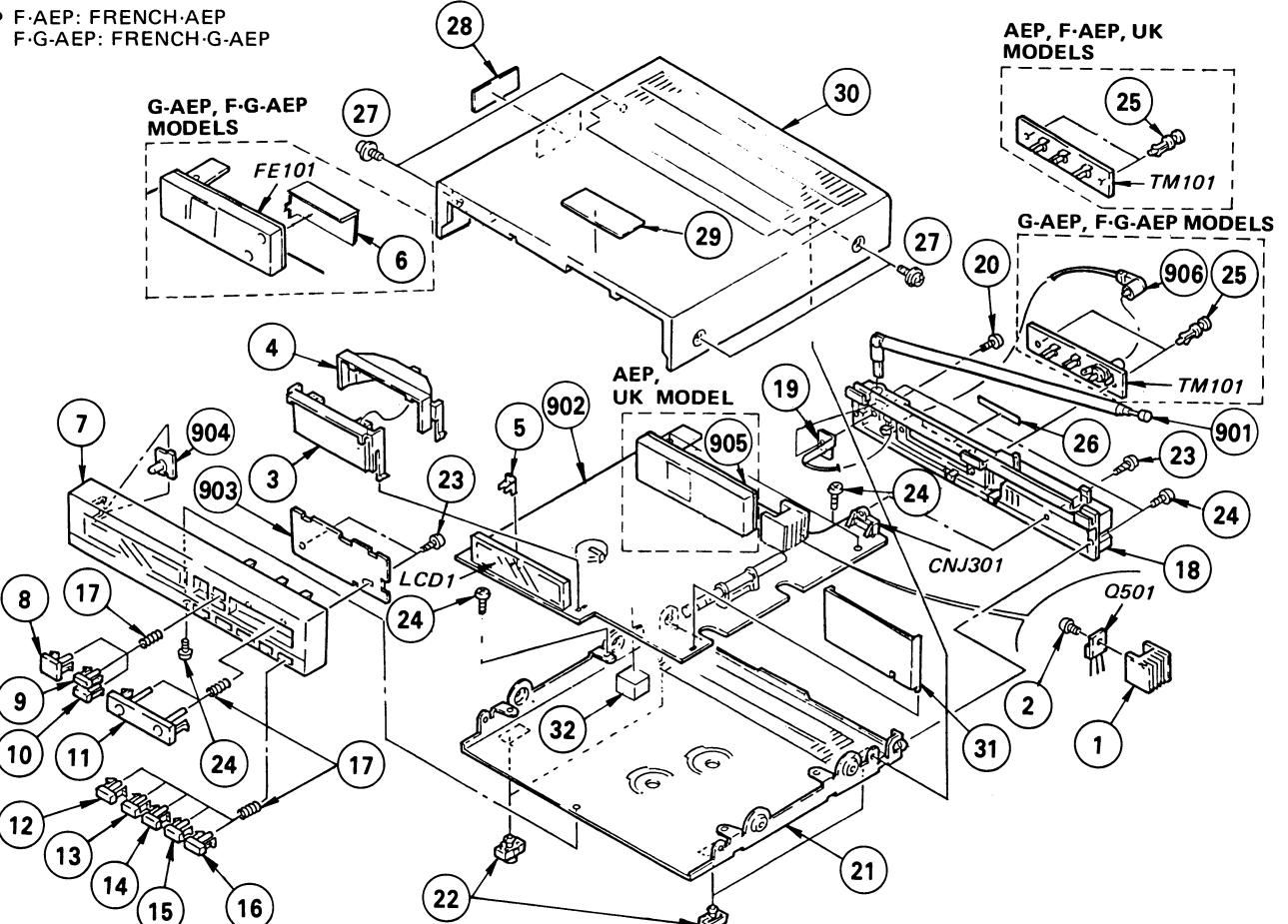
## NOTE:

The mechanical parts with no reference number in the exploded views are not supplied.

The construction parts of an assembled part are indicated with a collation number in the remark column.

Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- F-AEP: FRENCH-AEP  
F-G-AEP: FRENCH-G-AEP



| No. | Part No.      | Description                        | Remarks | No. | Part No.            | Description                                 | Remarks |
|-----|---------------|------------------------------------|---------|-----|---------------------|---|---------|
| 1   | *4-363-146-21 | HEAT SINK, V-OUT                   |         | 26  | *4-910-084-01       | (AEP,F-G-AEP,UK)...LABEL, ANTENNA           | C201    |
| 2   | 7-685-646-81  | SCREW +BVTP 3X8                    | TYPE2   | 27  | 4-910-085-01        | (G-AEP,F-G-AEP)...LABEL, ANTENNA            | C202    |
| 3   | *4-909-633-01 | ILLUMINATOR                        |         | 28  | 4-886-821-21        | SCREW, M3 CASE STOPPER                      | C203    |
| 4   | *4-904-515-01 | HOUSE, LAMP                        |         | 29  | 4-914-318-01        | (AEP,UK)...LABEL, MODEL NUMBER              | C204    |
| 5   | *4-904-507-01 | BLIND, LAMP                        |         | 30  | *4-914-313-01       | (F-AEP,F-G-AEP)...LABEL, MODEL NUMBER       | C204    |
| 6   | *4-910-359-01 | PLATE, SHIELD                      |         | 31  | *4-914-365-01       | (G-AEP)...LABEL, MODEL NUMBER               | C204    |
| 7   | X-4910-084-1  | PANEL ASSY, FRONT                  |         | 32  | 4-884-927-00        | LABEL (SYSTEM), CAUTION                     | C205    |
| 8   | 4-910-093-11  | BUTTON, SQUARE (BAND)              |         | 33  | X-4902-904-1        | CASE ASSY                                   | C206    |
| 9   | 4-910-087-01  | BUTTON (B), SQUARE (STEREO MUTING) |         | 34  | *4-910-090-01       | PLATE, SHIELD                               | C207    |
| 10  | 4-910-087-71  | BUTTON (B), SQUARE (MEMORY)        |         | 35  | 9-911-842-XX        | CUSHION (F)                                 | C208    |
| 11  | 4-910-094-11  | BUTTON, SQUARE (TUNING)            |         | 36  | 1-501-321-11        | ANTENNA, TELESCOPIC                         | C209    |
| 12  | 4-914-314-01  | BUTTON, SQUARE (PRESET 1)          |         | 37  | *A-4351-529-A       | (AEP,F-AEP,UK)...MOUNTED PCB, TUNER         | C210    |
| 13  | 4-914-314-11  | BUTTON, SQUARE (PRESET 2)          |         | 38  | *A-4351-530-A       | (G-AEP,F-G-AEP)...MOUNTED PCB, TUNER        | C211    |
| 14  | 4-914-314-21  | BUTTON, SQUARE (PRESET 3)          |         | 39  | *1-615-524-11       | PC BOARD, TACT                              | C212    |
| 15  | 4-914-314-31  | BUTTON, SQUARE (PRESET 4)          |         | 40  | *1-615-525-11       | PC BOARD, LED                               | C301    |
| 16  | 4-914-314-41  | BUTTON, SQUARE (PRESET 5)          |         | 41  | *1-615-526-11       | (AEP,F-AEP,UK)...PC BOARD, F.E              | C302    |
| 17  | 4-886-032-00  | SPRING, COMPRESSION                |         | 42  | *1-562-908-11       | (G-AEP,F-G-AEP)...CONNECTOR, FEMALE         | C303    |
| 18  | 4-910-098-01  | PLATE, JACK                        |         | 43  | CNJ301 1-562-479-12 | SOCKET, CONNECTOR 10P                       | C304    |
| 19  | *4-910-081-01 | TERMINAL BOARD, ROD ANTENNA        |         | 44  | FE101 1-463-611-11  | (G-AEP,F-G-AEP)...FRONT END, FM (FEE-4013A) | C305    |
| 20  | 7-682-548-09  | SCREW +B 3X8                       |         | 45  | LCD1 1-806-874-11   | INDICATOR, L-CRYSTAL LT5056                 |         |
| 21  | *4-902-941-21 | CHASSIS                            |         | 46  | 0501 8-729-288-02   | TRANSISTOR 2SD880                           |         |
| 22  | X-4902-937-1  | FOOT ASSY, RUBBER                  |         | 47  | TM101 1-536-733-00  | (G-AEP,F-G-AEP)...TERMINAL BOARD, ANTENNA   |         |
| 23  | 7-685-646-71  | SCREW +BVTP 3X8 TYPE2 N-S          |         | 48  | TM101 1-536-901-11  | (AEP,F-AEP,UK)...TERMINAL BOARD 3P, ANTENNA |         |
| 24  | 7-685-871-01  | SCREW +BVTT 3X6 (S)                |         |     |                     |   |         |
| 25  | 4-829-039-00  | RIVET, NYLON                       |         |     |                     |   |         |

NOTE:  
• Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• If there are such typical capacitors in the circuit.

• F-AEP  
F-G-AEP

Ref.No. Part No. Description Remarks

901 1-5 \*A-4-  
902 \*A-4-  
903 \*1-6  
904 \*1-6  
905 \*1-6  
906 \*1-5

BA601 1-1-  
C102 1-1-  
C103 1-1-  
C104 1-1-  
C105 1-1-  
C106 1-1-  
C107 1-1-  
C108 1-1-  
C109 1-1-  
C110 1-1-  
C111 1-1-  
C112 1-1-  
C113 1-1-  
C114 1-1-  
C115 1-1-  
C116 1-1-  
C117 1-1-  
C118 1-1-  
C119 1-1-  
C201 1-10  
C202 1-10  
C203 1-10  
C204 1-16  
C205 1-12  
C206 1-10  
C207 1-12  
C208 1-10  
C209 1-10  
C210 1-10  
C211 1-10  
C212 1-12  
C301 1-12  
C302 1-12  
C303 1-12  
C304 1-12  
C305 1-12

SECTION 4 (AEP, UK model)

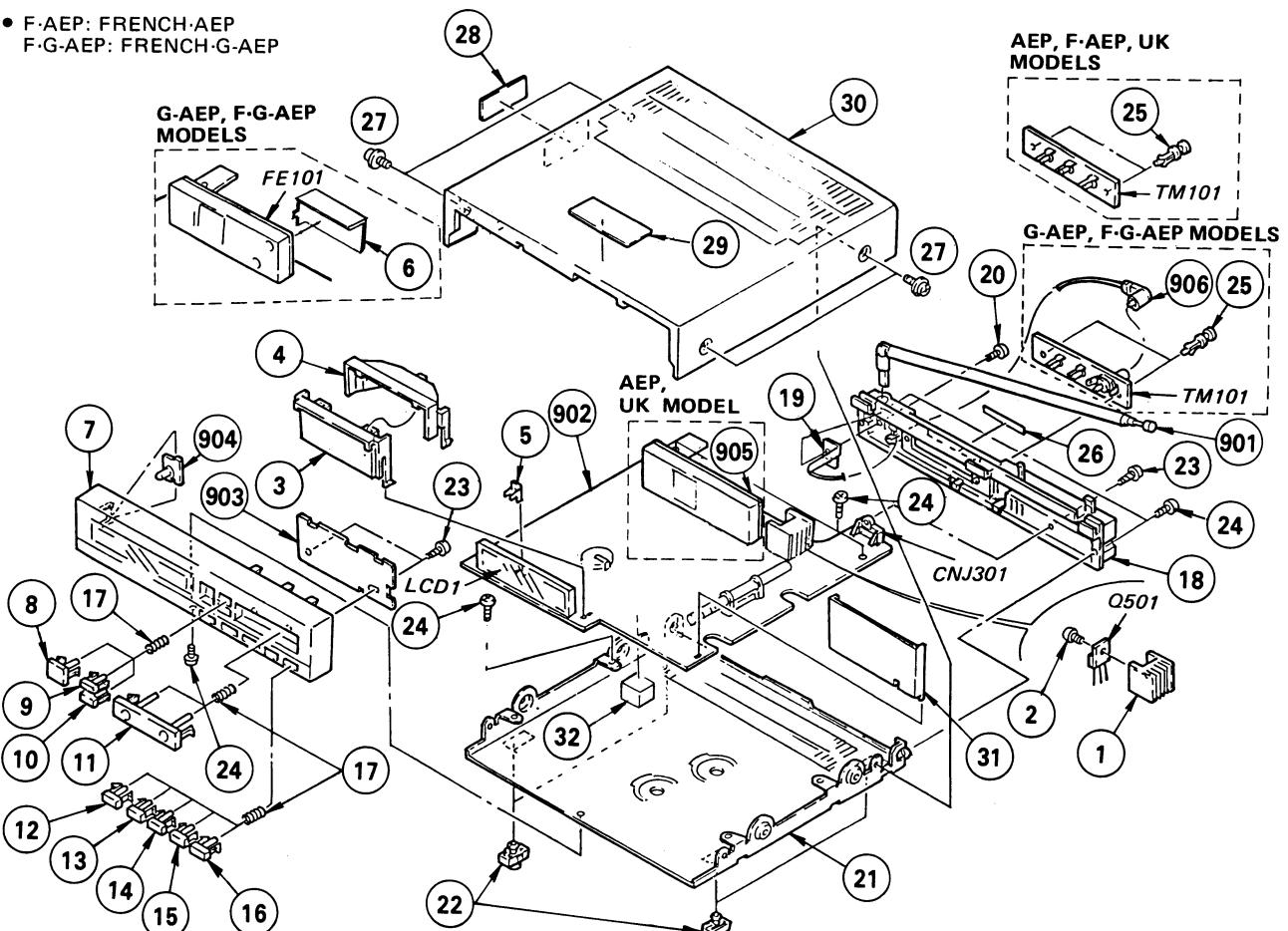
EXPLODED VIEWS AND PARTS LIST

NOTE:

The mechanical parts with no reference number in the exploded views are not supplied.

Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- F-AEP: FRENCH-AEP  
F-G-AEP: FRENCH-G-AEP



| No. | Part No.      | Description                        | Remarks   |
|-----|---------------|------------------------------------|-----------|
| 1   | *4-363-146-21 | HEAT SINK, V.OUT                   |           |
| 2   | 7-685-646-81  | SCREW +BVTT 3X8                    | TYPE2     |
| 3   | *4-909-633-01 | ILLUMINATOR                        |           |
| 4   | *4-904-515-01 | HOUSE, LAMP                        |           |
| 5   | *4-904-507-01 | BLIND, LAMP                        |           |
| 6   | *4-910-359-01 | PLATE, SHIELD                      |           |
| 7   | X-4910-084-1  | PANEL ASSY, FRONT                  |           |
| 8   | 4-910-093-11  | BUTTON, SQUARE (BAND)              |           |
| 9   | 4-910-087-01  | BUTTON (B), SQUARE (STEREO MUTING) |           |
| 10  | 4-910-087-71  | BUTTON (B), SQUARE (MEMORY)        |           |
| 11  | 4-910-094-11  | BUTTON, SQUARE (TUNING)            |           |
| 12  | 4-914-314-01  | BUTTON, SQUARE (PRESET 1)          |           |
| 13  | 4-914-314-11  | BUTTON, SQUARE (PRESET 2)          |           |
| 14  | 4-914-314-21  | BUTTON, SQUARE (PRESET 3)          |           |
| 15  | 4-914-314-31  | BUTTON, SQUARE (PRESET 4)          |           |
| 16  | 4-914-314-41  | BUTTON, SQUARE (PRESET 5)          |           |
| 17  | 4-886-032-00  | SPRING, COMPRESSION                |           |
| 18  | 4-910-098-01  | PLATE, JACK                        |           |
| 19  | *4-910-081-01 | TERMINAL BOARD, ROD ANTENNA        |           |
| 20  | 7-682-548-09  | SCREW +B 3X8                       |           |
| 21  | *4-902-941-21 | CHASSIS                            |           |
| 22  | X-4902-937-1  | FOOT ASSY, RUBBER                  |           |
| 23  | 7-685-646-71  | SCREW +BVTP 3X8                    | TYPE2 N-S |
| 24  | 7-685-871-01  | SCREW +BVTT 3X6 (S)                |           |
| 25  | 4-829-039-00  | RIVET, NYLON                       |           |

FH-150R  
ST-177R

FH-150R  
ST-177R

(AEP, UK model)

SECTION 5

ELECTRICAL PARTS LIST

NOTE:

Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

- F-AEP: FRENCH-AEP  
F-G-AEP: FRENCH-G-AEP

ELECTRICAL PARTS

| Ref.No. | Part No.                       | Description   |
|---------|--------------------------------|---|
| 901     | 1-501-321-11                   | ANTENNA, TELESCOPIC   |
| 902     | *A-4351-529-A<br>*A-4351-439-A | (AEP,F-AEP,UK)...MOUNTED PCB, TUNER<br>(G-AEP,F-G-AEP)...MOUNTED PCB, TUNER |
| 903     | *1-615-524-11                  | PC BOARD, TACT  |
| 904     | *1-615-525-11                  | PC BOARD, LED   |
| 905     | *1-615-526-11                  | (AEP,F-AEP,UK)...PC BOARD, F.E  |
| 906     | *1-562-908-11                  | (G-AEP,F-G-AEP)...CONNECTOR, FEMALE (NO SHIELD)                             |

BA601 1-528-120-00 BATTERY, LITHIUM (CR-2025)

|      |              |   |
|------|--------------|---|
| C102 | 1-162-198-31 | (AEP,F-AEP,UK)...CERAMIC 8.2PF 10% 50V  |
| C103 | 1-162-193-31 | (AEP,F-AEP,UK)...CERAMIC 3.3PF 10% 50V  |
| C104 | 1-162-306-31 | (AEP,F-AEP,UK)...CERAMIC 0.01MF 20% 16V |

|      |              |   |
|------|--------------|---|
| C105 | 1-162-306-31 | (AEP,F-AEP,UK)...CERAMIC 0.01MF 20% 16V |
| C106 | 1-162-199-31 | (AEP,F-AEP,UK)...CERAMIC 10PF 5% 50V    |
| C107 | 1-162-191-31 | (AEP,F-AEP,UK)...CERAMIC 2.2PF 10% 50V  |

|      |              |  |
|------|--------------|--|
| C108 | 1-162-203-31 | (AEP,F-AEP,UK)...CERAMIC 15PF 5% 50V   |
| C109 | 1-162-286-31 | (AEP,F-AEP,UK)...CERAMIC 220PF 10% 50V |
| C110 | 1-162-187-31 | (AEP,F-AEP,UK)...CERAMIC 1PF 20% 50V   |

|      |              |   |
|------|--------------|---|
| C111 | 1-162-306-31 | (AEP,F-AEP,UK)...CERAMIC 0.01MF 20% 16V |
| C112 | 1-162-211-31 | (AEP,F-AEP,UK)...CERAMIC 33PF 5% 50V    |
| C113 | 1-162-203-31 | (AEP,F-AEP,UK)...CERAMIC 15PF 5% 50V    |

|      |              |  |
|------|--------------|--|
| C114 | 1-162-198-31 | (AEP,F-AEP,UK)...CERAMIC 8.2PF 10% 50V |
| C115 | 1-162-196-31 | (AEP,F-AEP,UK)...CERAMIC 5.6PF 10% 50V |
| C116 | 1-162-191-31 | (AEP,F-AEP,UK)...CERAMIC 2.2PF 10% 50V |

|      |              |                        |
|------|--------------|------------------------|
| C117 | 1-162-306-31 | CERAMIC 0.01MF 20% 16V |
| C118 | 1-123-332-00 | ELECT 47MF 20% 25V     |
| C119 | 1-101-005-00 | CERAMIC 0.022MF 50V    |

|      |              |                     |
|------|--------------|---------------------|
| C201 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C202 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C203 | 1-101-005-00 | CERAMIC 0.022MF 50V |

|      |              |   |
|------|--------------|---|
| C204 | 1-162-211-31 | (AEP,F-AEP,UK)...CERAMIC 33PF 5% 50V    |
| C204 | 1-162-290-31 | (G-AEP,F-G-AEP)...CERAMIC 470PF 10% 50V |

|      |              |                     |
|------|--------------|---------------------|
| C205 | 1-123-380-00 | ELECT 1MF 20% 50V   |
| C206 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C207 | 1-123-332-00 | ELECT 47MF 20% 16V  |

|      |              |                     |
|------|--------------|---------------------|
| C208 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C209 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C210 | 1-101-005-00 | CERAMIC 0.022MF 50V |

|      |              |                     |
|------|--------------|---------------------|
| C211 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C212 | 1-123-380-00 | ELECT 1MF 20% 50V   |
| C301 | 1-123-332-00 | ELECT 47MF 20% 16V  |

|      |              |   |
|------|--------------|---|
| C204 | 1-162-211-31 | (AEP,F-AEP,UK)...CERAMIC 33PF 5% 50V    |
| C204 | 1-162-290-31 | (G-AEP,F-G-AEP)...CERAMIC 470PF 10% 50V |
| C205 | 1-123-380-00 | ELECT 1MF 20% 50V                       |

|      |              |                     |
|------|--------------|---------------------|
| C206 | 1-101-005-00 | CERAMIC 0.022MF 50V |
| C207 | 1-123-332-00 | ELECT 47MF 20% 16V  |
| C208 | 1-101-005-00 | CERAMIC 0.022MF 50V |

ELECTRICAL PARTS

| Ref.No.             | Part No.                             | Description                       |
|---------------------|--------------------------------------|-----------------------------------|
| C433                | 1-161-494-00                         | CERAMIC                           |
| C434                | 1-101-005-00                         | CERAMIC                           |
| C501                | 1-101-005-00                         | CERAMIC                           |
| C502                | 1-123-333-00                         | ELECT                             |
| C503                | 1-101-005-00                         | CERAMIC                           |
| C504                | 1-123-307-00                         | ELECT                             |
| C505                | 1-101-005-00                         | CERAMIC                           |
| C506                | 1-101-005-00                         | CERAMIC                           |
| C601                | 1-101-005-00                         | CERAMIC                           |
| C602                | 1-123-307-00                         | ELECT                             |
| C603                | 1-102-852-00                         | CERAMIC                           |
| C604                | 1-102-852-00                         | CERAMIC                           |
| C605                | 1-123-380-00                         | ELECT                             |
| C606                | 1-101-005-00                         | CERAMIC                           |
| C607                | 1-162-306-31                         | CERAMIC                           |
| C608                | 1-101-005-00                         | CERAMIC                           |
| C609                | 1-123-356-00                         | ELECT                             |
| C610                | 1-101-005-00                         | CERAMIC                           |
| C611                | 1-123-332-00                         | ELECT                             |
| C612                | 1-136-171-00                         | FILM                              |
| C613                | 1-130-487-00                         | MYLAR                             |
| C614                | 1-123-609-00                         | ELECT                             |
| C615                | 1-136-171-00                         | FILM                              |
| C616                | 1-130-487-00                         | MYLAR                             |
| C617                | 1-123-609-00                         | ELECT                             |
| C630                | 1-162-294-31                         | CERAMIC                           |
| C631                | 1-101-005-00                         | CERAMIC                           |
| CF201               | 1-527-968-00                         | FILTER, CERAMIC                   |
| CF202               | 1-527-968-00                         | FILTER, CERAMIC                   |
| CF203               | 1-527-968-00                         | (G-AEP,F-G-AEP)...FILTER, CERAMIC |
| CF401               | 1-527-937-00                         | FILTER, CERAMIC                   |
| CF402               | 1-527-981-00                         | FILTER, CERAMIC                   |
| CNJ101*1-562-327-00 | (AEP,F-AEP,UK)...                    | SOCKET, CONNECTOR 3P              |
| CNJ201*1-560-060-00 | PIN, CONNECTOR 2P (NULL CHECK POINT) |                                   |
| CNJ301 1-562-479-12 | SOCKET, CONNECTOR 10P                |                                   |
| CNJ601*1-560-604-00 | PIN, CONNECTOR 5P                    |                                   |
| CNJ602*1-560-602-00 | PIN, CONNECTOR 3P                    |                                   |
| CNJ603*1-560-603-00 | PIN, CONNECTOR 4P                    |                                   |
| CT401               | 1-141-227-00                         | CAP, CERAMIC TRIMMER              |
| CT402               | 1-141-227-00                         | CAP, CERAMIC TRIMMER              |
| CT403               | 1-141-227-00                         | CAP, CERAMIC TRIMMER              |
| CT404               | 1-141-227-00                         | CAP, CERAMIC TRIMMER              |
| D101                | 8-719-918-45                         | (AEP,G-AEP,UK)...DIODE KV1310     |
| D102                | 8-719-918-45                         | (AEP,G-AEP,UK)...DIODE KV1310     |
| D103                | 8-719-918-45                         | (AEP,G-AEP,UK)...DIODE KV1310     |
| D105                | 8-719-107-94                         | (AEP,G-AEP,UK)...DIODE 1SS202-1   |
| D201                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D202                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D301                | 8-719-904-08                         | DIODE SLH54VC3                    |
| D302                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D303                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D304                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D401                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D402                | 8-719-902-79                         | DIODE KV1236Z                     |
| D403                | 8-719-902-79                         | DIODE KV1236Z                     |
| D422                | 8-719-107-94                         | DIODE 1SS202-1                    |
| D501                | 8-719-910-23                         | DIODE HZ12A3L                     |
| D502                | 8-719-910-64                         | DIODE HZ6B1L                      |
| D601                | 8-719-107-94                         | DIODE 1SS202-1                    |

ELECTRICAL PARTS

| Ref.No. | Part No.      | Description                                    |
|---------|---------------|--|
| D602    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D603    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D604    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D605    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D606    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D607    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D608    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D609    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D610    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D611    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D612    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D613    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D615    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D616    | 8-719-107-94  | DIODE 1SS202-1                                 |
| D617    | 8-719-107-94  | DIODE 1SS202-1                                 |
| FE101   | 1-463-611-11  | (G-AEP,F-G-AEP)...FRONT END, FM<br>(FEE-4013A) |
| FL201   | 1-235-126-00  | ENCAPSULATED COMPONENT                         |
| IC201   | 8-759-812-31  | IC LA1231                                      |
| IC301   | 8-759-801-80  | IC LA3401                                      |
| IC401   | 8-759-812-45  | IC LA1245                                      |
| IC601   | 8-759-204-24  | IC TC9302F-005                                 |
| IC602   | 8-759-202-63  | IC TC9172P                                     |
| L101    | *1-422-214-11 | (AEP,F-AEP,UK)...COIL, AIR-CORE                |
| L102    | *1-422-040-00 | (AEP,F-AEP,UK)...COIL, AIR-CORE                |
| L103    | *1-422-081-00 | (AEP,F-AEP,UK)...COIL (WITH CORE)              |
| L104    | *1-422-039-00 | (AEP,F-AEP,UK)...COIL, AIR-CORE                |
| L105    | *1-459-396-00 | (AEP,F-AEP,UK)...COIL (WITH CORE)              |
| L301    | 1-408-924-00  | MICRO INDUCTOR 10MMH                           |
| L302    | 1-408-924-00  | MICRO INDUCTOR 10MMH                           |
| L401    | 1-402-151-11  | ANTENNA, FERRITE-ROD (LW/MW)                   |
| L402    | 1-406-089-11  | COIL (OSC)                                     |
| L403    | 1-406-090-11  | COIL (OSC)                                     |
| LCD1    | 1-806-874-11  | INDICATOR, L-CRYSTAL LT5056                    |
| PL501   | 1-518-511-21  | LAMP, PILOT, YELLOW                            |
| Q101    | 8-729-353-52  | (AEP,G-AEP,UK)...TRANSISTOR 2SC535             |
| Q102    | 8-729-353-52  | (AEP,G-AEP,UK)...TRANSISTOR 2SC535             |
| Q103    | 8-729-672-42  | (AEP,G-AEP,UK)...TRANSISTOR 2SC2724-C          |
| Q104    | 8-729-672-42  | (AEP,G-AEP,UK)...TRANSISTOR 2SC2724-C          |
| Q201    | 8-729-672-42  | TRANSISTOR 2SC2724-C                           |
| Q301    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q302    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q303    | 8-729-900-63  | TRANSISTOR DTA124ES                            |
| Q304    | 8-729-900-36  | TRANSISTOR DTC124ES                            |
| Q305    | 8-729-900-36  | TRANSISTOR DTC124ES                            |
| Q401    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q402    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q403    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q404    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q405    | 8-729-173-37  | TRANSISTOR 2SA733-P                            |
| Q406    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q407    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q501    | 8-729-288-02  | TRANSISTOR 2SD880                              |
| Q502    | 8-729-224-61  | TRANSISTOR 2SK246-Y                            |
| Q601    | 8-729-201-56  | TRANSISTOR 2SK246-GR2                          |
| Q602    | 8-729-606-33  | TRANSISTOR 2SC2603-F                           |
| Q603    | 8-729-201-56  | TRANSISTOR 2SK246-GR2                          |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description              |      |    |      |  |
|---------|--------------|--------------------------|------|----|------|--|
| Q604    | 8-729-606-33 | TRANSISTOR 2SC2603-F     |      |    |      |  |
| Q605    | 8-729-900-36 | TRANSISTOR DTC124ES      |      |    |      |  |
| Q606    | 8-729-900-63 | TRANSISTOR DTA124ES      |      |    |      |  |
| Q607    | 8-729-900-63 | TRANSISTOR DTA124ES      |      |    |      |  |
| Q608    | 8-729-900-36 | TRANSISTOR DTC124ES      |      |    |      |  |
| Q609    | 8-729-900-63 | TRANSISTOR DTA124ES      |      |    |      |  |
| Q610    | 8-729-900-36 | TRANSISTOR DTC124ES      |      |    |      |  |
| Q611    | 8-729-900-63 | TRANSISTOR DTA124ES      |      |    |      |  |
| Q614    | 8-729-606-33 | TRANSISTOR 2SC2603-F     |      |    |      |  |
| Q615    | 8-729-900-36 | TRANSISTOR DTC124ES      |      |    |      |  |
| R101    | 1-249-441-11 | (AEP,F·AEP,UK)...CARBON  | 100K | 5% | 1/6W |  |
| R102    | 1-247-901-00 | (AEP,F·AEP,UK)...CARBON  | 820K | 5% | 1/6W |  |
| R103    | 1-249-405-00 | (AEP,F·AEP,UK)...CARBON  | 100  | 5% | 1/6W |  |
| R104    | 1-249-405-00 | (AEP,F·AEP,UK)...CARBON  | 100  | 5% | 1/6W |  |
| R105    | 1-249-441-11 | (AEP,F·AEP,UK)...CARBON  | 100K | 5% | 1/6W |  |
| R106    | 1-247-901-00 | (AEP,F·AEP,UK)...CARBON  | 820K | 5% | 1/6W |  |
| R107    | 1-247-819-00 | (AEP,F·AEP,UK)...CARBON  | 330  | 5% | 1/6W |  |
| R108    | 1-247-795-00 | (AEP,F·AEP,UK)...CARBON  | 33   | 5% | 1/6W |  |
| R108    | 1-249-405-00 | (G-AEP,F·G-AEP)...CARBON | 100  | 5% | 1/6W |  |
| R109    | 1-249-405-00 | (AEP,F·AEP,UK)...CARBON  | 100  | 5% | 1/6W |  |
| R110    | 1-247-893-00 | (AEP,F·AEP,UK)...CARBON  | 390K | 5% | 1/6W |  |
| R111    | 1-249-425-11 | (AEP,F·AEP,UK)...CARBON  | 4.7K | 5% | 1/6W |  |
| R112    | 1-247-859-00 | (AEP,F·AEP,UK)...CARBON  | 15K  | 5% | 1/6W |  |
| R113    | 1-247-893-00 | (AEP,F·AEP,UK)...CARBON  | 390K | 5% | 1/6W |  |
| R114    | 1-249-405-00 | (AEP,F·AEP,UK)...CARBON  | 100  | 5% | 1/6W |  |
| R115    | 1-247-799-00 | CARBON                   | 47   | 5% | 1/6W |  |
| R116    | 1-247-706-11 | (G-AEP,F·G-AEP)...CARBON | 330  | 5% | 1/4W |  |
| R201    | 1-247-901-00 | CARBON                   | 820K | 5% | 1/6W |  |
| R202    | 1-247-819-00 | CARBON                   | 330  | 5% | 1/6W |  |
| R203    | 1-247-819-00 | CARBON                   | 330  | 5% | 1/6W |  |
| R204    | 1-247-873-00 | CARBON                   | 56K  | 5% | 1/6W |  |
| R205    | 1-249-417-11 | CARBON                   | 1K   | 5% | 1/6W |  |
| R206    | 1-247-859-00 | CARBON                   | 15K  | 5% | 1/6W |  |
| R207    | 1-249-433-11 | CARBON                   | 22K  | 5% | 1/6W |  |
| R208    | 1-247-799-00 | CARBON                   | 47   | 5% | 1/6W |  |
| R209    | 1-247-859-00 | CARBON                   | 15K  | 5% | 1/6W |  |
| R210    | 1-249-441-11 | CARBON                   | 100K | 5% | 1/6W |  |
| R211    | 1-249-429-11 | CARBON                   | 10K  | 5% | 1/6W |  |
| R301    | 1-247-799-00 | CARBON                   | 47   | 5% | 1/6W |  |
| R302    | 1-249-423-11 | CARBON                   | 3.3K | 5% | 1/6W |  |
| R303    | 1-249-435-11 | CARBON                   | 33K  | 5% | 1/6W |  |
| R304    | 1-247-833-00 | CARBON                   | 1.2K | 5% | 1/6W |  |
| R305    | 1-249-437-11 | CARBON                   | 47K  | 5% | 1/6W |  |
| R306    | 1-249-437-11 | CARBON                   | 47K  | 5% | 1/6W |  |
| R307    | 1-249-419-11 | CARBON                   | 1.5K | 5% | 1/6W |  |
| R308    | 1-249-419-11 | CARBON                   | 1.5K | 5% | 1/6W |  |
| R309    | 1-249-429-11 | CARBON                   | 10K  | 5% | 1/6W |  |
| R310    | 1-249-429-11 | CARBON                   | 10K  | 5% | 1/6W |  |
| R312    | 1-249-437-11 | CARBON                   | 47K  | 5% | 1/6W |  |
| R313    | 1-249-417-11 | CARBON                   | 1K   | 5% | 1/6W |  |
| R314    | 1-249-437-11 | CARBON                   | 47K  | 5% | 1/6W |  |
| R316    | 1-249-437-11 | CARBON                   | 47K  | 5% | 1/6W |  |
| R319    | 1-249-437-11 | CARBON                   | 47K  | 5% | 1/6W |  |
| R401    | 1-249-421-11 | CARBON                   | 2.2K | 5% | 1/6W |  |
| R402    | 1-249-405-00 | CARBON                   | 100  | 5% | 1/6W |  |
| R403    | 1-249-414-11 | CARBON                   | 560  | 5% | 1/6W |  |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description |      |    |      |  |
|---------|--------------|-------------|------|----|------|--|
| R404    | 1-249-423-11 | CARBON      | 3.3K | 5% | 1/6W |  |
| R405    | 1-247-799-00 | CARBON      | 47   | 5% | 1/6W |  |
| R406    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R407    | 1-249-405-00 | CARBON      | 100  | 5% | 1/6W |  |
| R408    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R409    | 1-247-811-00 | CARBON      | 150  | 5% | 1/6W |  |
| R410    | 1-247-857-00 | CARBON      | 12K  | 5% | 1/6W |  |
| R411    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R413    | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |  |
| R414    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R415    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R418    | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |  |
| R419    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R420    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R421    | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |  |
| R422    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R423    | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |  |
| R432    | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |  |
| R433    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R434    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R435    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R436    | 1-247-819-00 | CARBON      | 330  | 5% | 1/6W |  |
| R437    | 1-249-437-11 | CARBON      | 47K  | 5% | 1/6W |  |
| R439    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |
| R501    | 1-247-815-00 | CARBON      | 220  | 5% | 1/6W |  |
| R502    | 1-247-823-00 | CARBON      | 470  | 5% | 1/6W |  |
| R503    | 1-247-775-00 | CARBON      | 4.7  | 5% | 1/6W |  |
| R504    | 1-249-417-11 | CARBON      | 1K   | 5% | 1/6W |  |
| R601    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |
| R602    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |
| R603    | 1-249-435-11 | CARBON      | 33K  | 5% | 1/6W |  |
| R604    | 1-249-423-00 | CARBON      | 3.3K | 5% | 1/6W |  |
| R605    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |
| R606    | 1-247-435-11 | CARBON      | 33K  | 5% | 1/6W |  |
| R607    | 1-247-797-00 | CARBON      | 39   | 5% | 1/6W |  |
| R608    | 1-247-799-00 | CARBON      | 47   | 5% | 1/6W |  |
| R609    | 1-249-437-11 | CARBON      | 47K  | 5% | 1/6W |  |
| R610    | 1-247-817-00 | CARBON      | 270  | 5% | 1/6W |  |
| R611    | 1-247-829-00 | CARBON      | 820  | 5% | 1/6W |  |
| R612    | 1-249-414-11 | CARBON      | 560  | 5% | 1/6W |  |
| R613    | 1-249-435-00 | CARBON      | 33K  | 5% | 1/6W |  |
| R614    | 1-249-421-11 | CARBON      | 2.2K | 5% | 1/6W |  |
| R615    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |
| R616    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |
| R617    | 1-249-437-11 | CARBON      | 47K  | 5% | 1/6W |  |
| R618    | 1-247-817-00 | CARBON      | 270  | 5% | 1/6W |  |
| R619    | 1-247-829-00 | CARBON      | 820  | 5% | 1/6W |  |
| R620    | 1-249-414-11 | CARBON      | 560  | 5% | 1/6W |  |
| R621    | 1-247-885-00 | CARBON      | 180K | 5% | 1/6W |  |
| R622    | 1-249-421-11 | CARBON      | 2.2K | 5% | 1/6W |  |
| R623    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |
| R624    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |
| R625    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |
| R640    | 1-249-435-11 | CARBON      | 33K  | 5% | 1/6W |  |
| R643    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |
| R644    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description                                      |
|---------|--------------|--|
| RV201   | 1-228-997-00 | RES, ADJ, CARBON 100K                            |
| RV301   | 1-228-997-00 | (AEP,F-AEP,UK)...RES, ADJ, CARBON 100K           |
| RV301   | 1-228-998-00 | (G-AEP,F-G-AEP)..RES, ADJ, CARBON 220K           |
| S701    | 1-554-303-21 | SWITCH, KEY BOARD (BAND)                         |
| S702    | 1-554-303-21 | SWITCH, KEY BOARD (STEREO MUTING)                |
| S703    | 1-554-303-21 | SWITCH, KEY BOARD (MEMORY)                       |
| S704    | 1-554-303-21 | SWITCH, KEY BOARD (TUNING -)                     |
| S705    | 1-554-303-21 | SWITCH, KEY BOARD (TUNING +)                     |
| S706    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 1)                     |
| S707    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 2)                     |
| S708    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 3)                     |
| S709    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 4)                     |
| S710    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 5)                     |
| T201    | 1-404-419-00 | COIL, DISCRIMINATOR                              |
| T401    | 1-404-535-11 | COIL (WITH IFT)                                  |
| TM101   | 1-536-733-00 | (G-AEP,F-G-AEP)<br>....TERMINAL BOARD, ANTENNA   |
| TM101   | 1-536-901-11 | (AEP,F-AEP,UK)<br>....TERMINAL BOARD 3P, ANTENNA |
| X301    | 1-567-250-11 | OSCILLATOR, CERAMIC                              |
| X601    | 1-567-125-00 | VIBRATOR, CRYSTAL                                |

# FM STEREO/FM-AM TUNER [ST-177R]

FH-15OR

ST-177R

(E model)

## SECTION 1

### BLOCK DIAGRAM

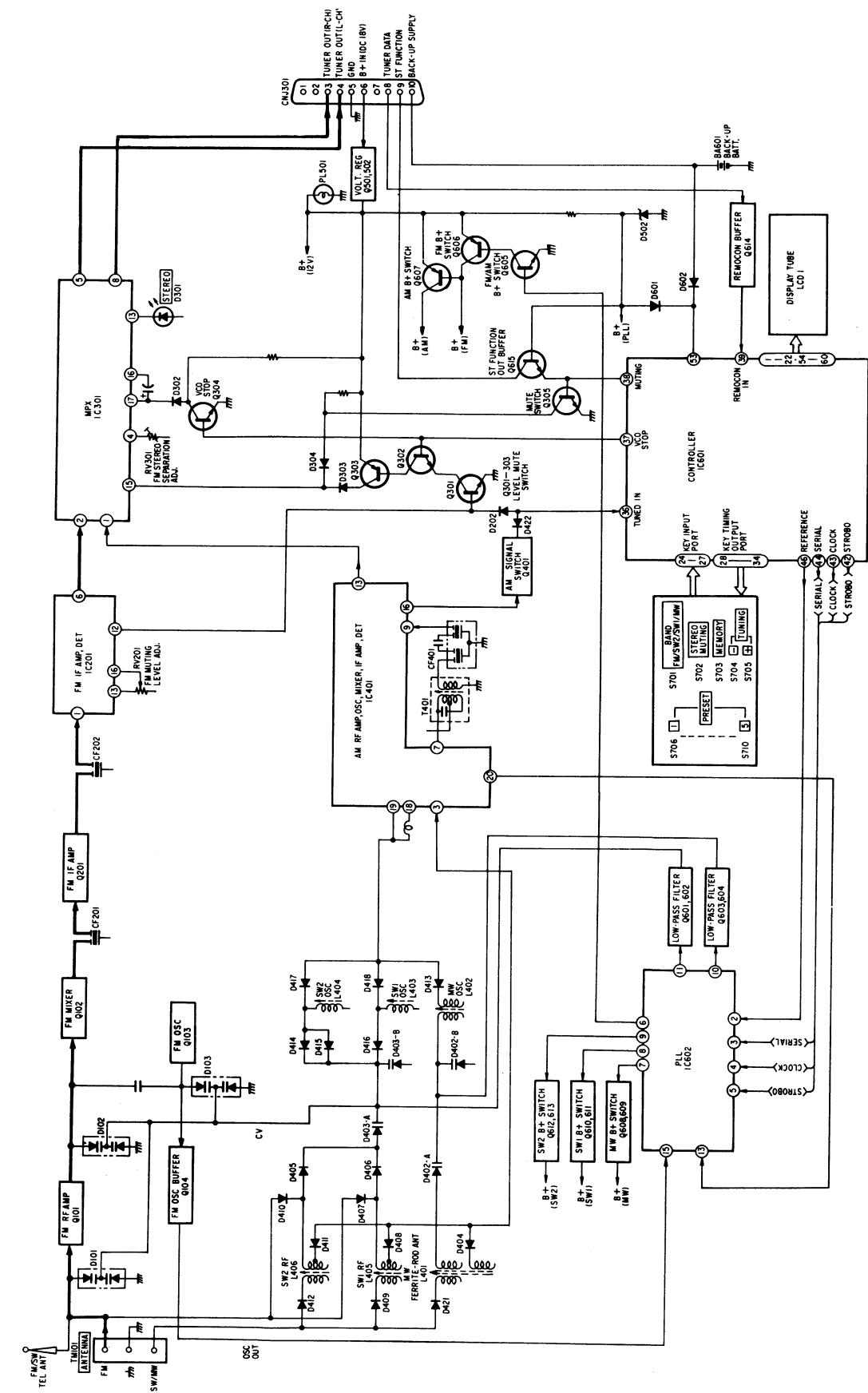
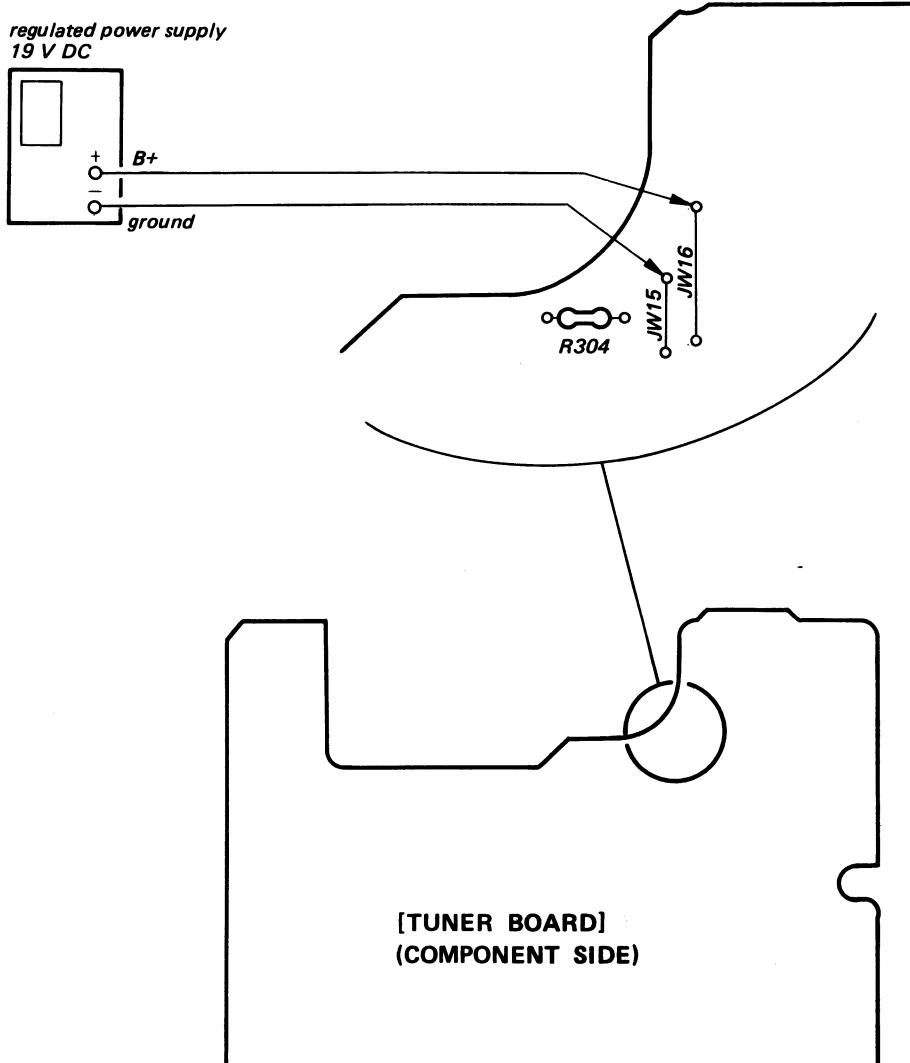
(E model)

#### REPAIRING PRECAUTION

##### [To apply B+ voltage]

The power of this unit is fed from TA-177R.

Because of this, connect the regulated power supply as illustrated below when this unit alone operates.



**SECTION 2  
ADJUSTMENTS**

(E model)

**FH-150R  
ST-177R**

**FH-150R  
ST-177R**

(E model)

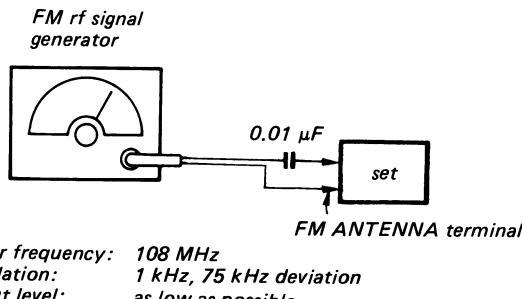
**FM SECTION 1**

**Setting:**

BAND selector switch . . . FM

**FM OSC Voltage Adjustment**

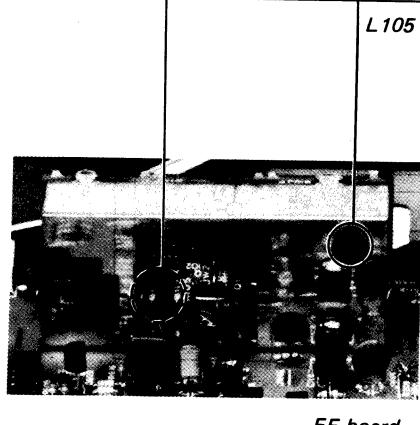
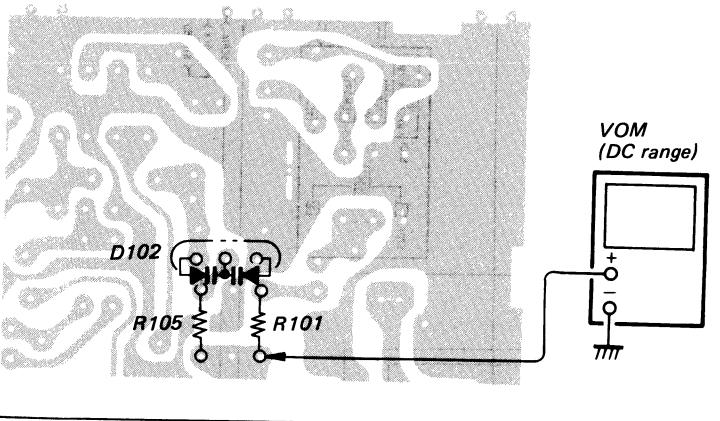
**Setting:**



**Procedure:**

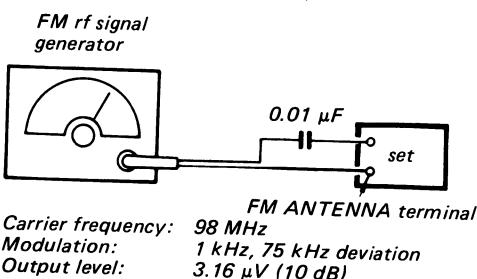
1. Push the TUNING (+, -) button for 108 MHz.
2. Adjust L105 for 8.9 – 9 V reading on the VOM.

**[FE BOARD] (CONDUCTOR SIDE)**



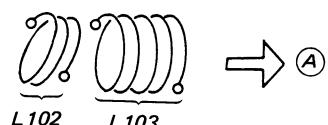
**FM Tracking Adjustment**

**Setting:**

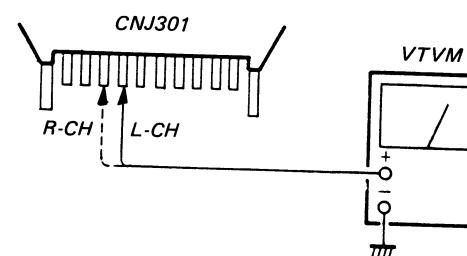
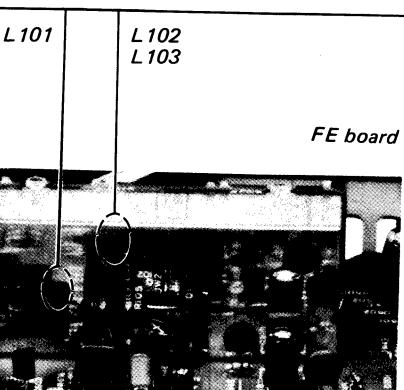


**Procedure:**

1. Push TUNING (+, -) button for 98 MHz.
2. Approach L102 and L103 not to contact each other.
3. Adjust L101 and L103, and repeat the adjustment 2 – 3 times for maximum VTVM reading.  
( Adjust L103 in the direction as shown by arrow A.)



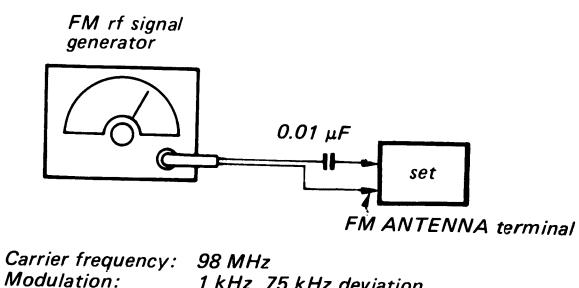
*Note: Do not touch L102.*



**Note:** FM discriminator alignment should be made after FM tracking adjustment.

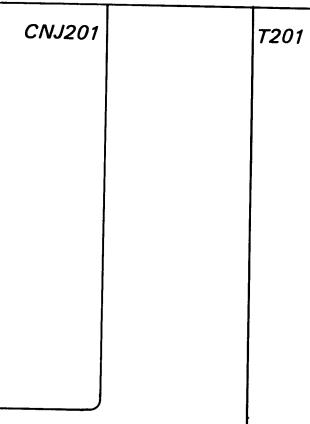
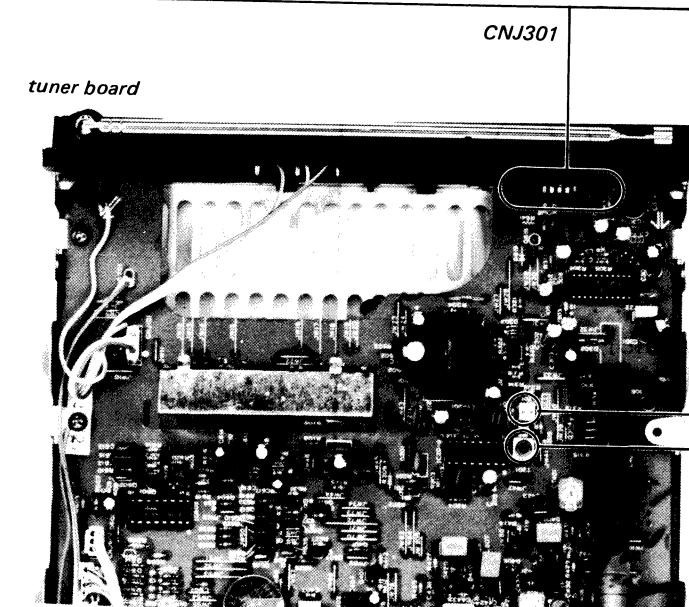
**FM Discriminator Alignment (NULL Check)**

**Setting:**

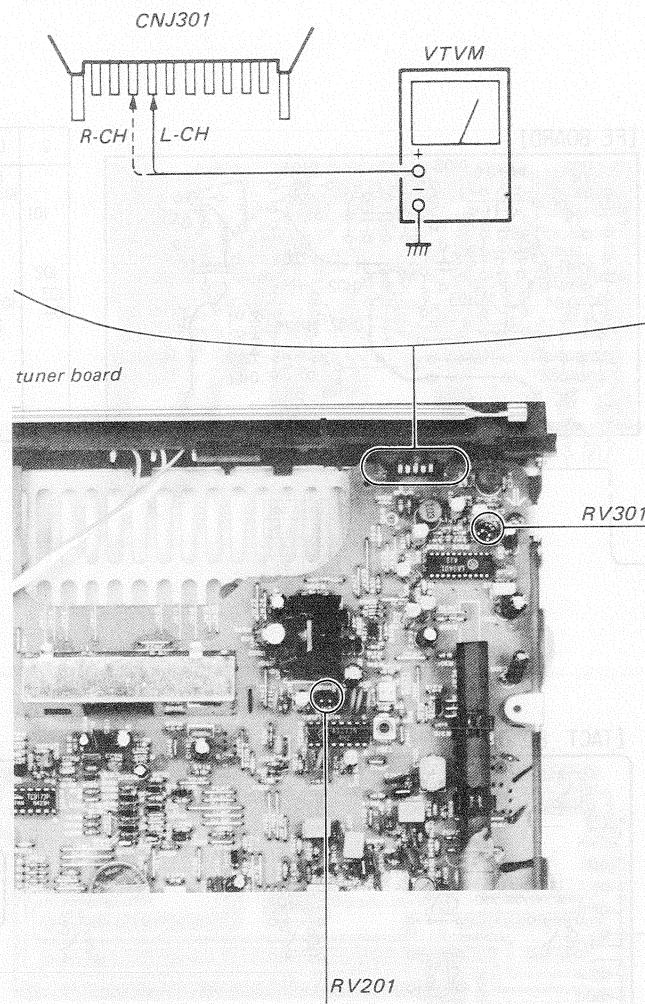


**Procedure:**

1. Push the TUNING (+, -) button for 98 MHz.
2. Adjust T201 for 0 V reading on the VOM.



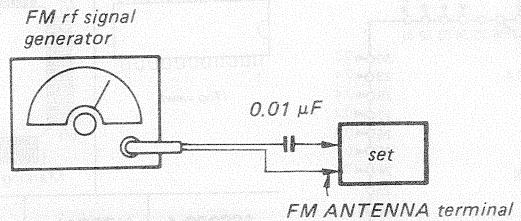
**FM SECTION 2**



**FM Muting Level Adjustment**

**Setting:**  
STEREO MUTING switch . . . ON

**Procedure:**



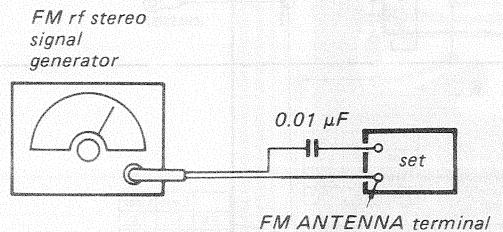
*Carrier frequency: 98 MHz  
Modulation: 1 kHz, 75 kHz deviation  
Output level: 17.9 μV (25 dB)*

- Push the TUNING (+, -) button for 98 MHz.
- Adjust RV201 for a point the VTVM reading just drops to 0 V.

**FM Stereo Separation Adjustment**

**Setting:**  
STEREO MUTING switch . . . ON

**Procedure:**



*Carrier frequency: 98 MHz  
Modulation: audio (1 kHz): 33.75 kHz deviation  
pilot (19 kHz): 7.5 kHz deviation  
sub-channel (38 kHz): 33.75 kHz deviation  
Output level: 1 mV (60 dB)  
Mode: stereo*

| FM stereo signal generator output channel | VTVM connection | VTVM reading (dB)                 |
|---|-----------------|-----------------------------------|
| L-CH                                      | L-CH            | (A)                               |
| R-CH                                      | L-CH            | Adjust RV301 for minimum reading. |
| R-CH                                      | R-CH            | (C)                               |
| L-CH                                      | R-CH            | Adjust RV301 for minimum reading. |

L-CH Stereo separation: (A) – (B)

R-CH Stereo separation: (C) – (D)

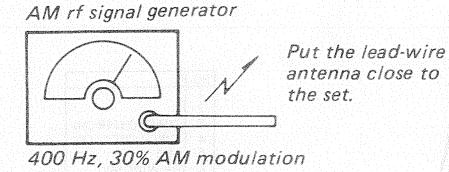
The separations of both channels should be equal.

**AM SECTION**

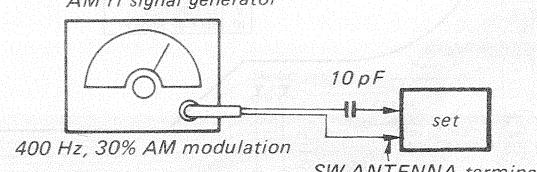
**Setting:**

BAND selector switch: MW, SW1 or SW2

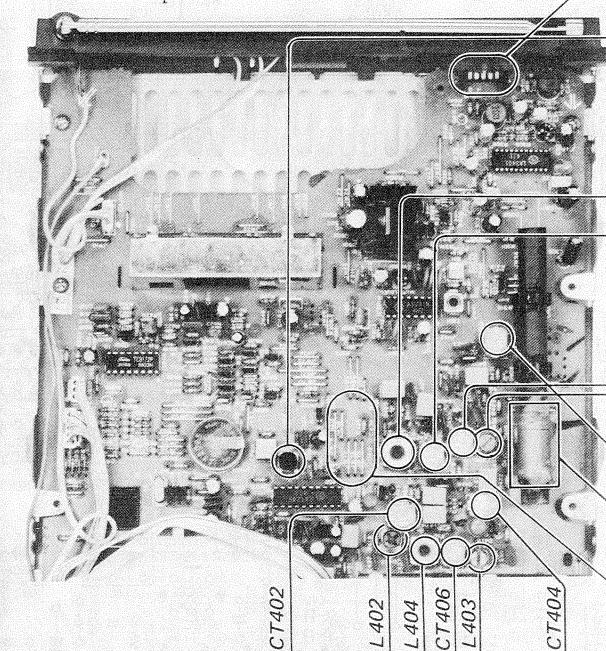
– MW –



– SW –



- Repeat the procedures in each adjustment several times, and the OSC voltage and tracking adjustments should be finally done by the timer capacitors.



| <b>AM IF ALIGNMENT</b>                |              |
|---------------------------------------|--------------|
| Adjust for a maximum reading on VTVM. | T401 450 kHz |

| <b>SW2 TRACKING ADJUSTMENT</b>        |              |
|---------------------------------------|--------------|
| Adjust for a maximum reading on VTVM. | L406 10 MHz  |
|                                       | CT405 20 MHz |

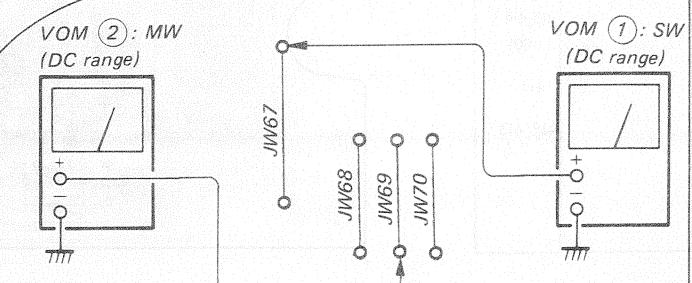
| <b>SW1 TRACKING ADJUSTMENT</b>        |               |
|---------------------------------------|---------------|
| Adjust for a maximum reading on VTVM. | CT403 6.5 MHz |
|                                       | L405 3.5 MHz  |

| <b>MW TRACKING ADJUSTMENT</b>         |                 |
|---------------------------------------|-----------------|
| Adjust for a maximum reading on VTVM. | CT401 1,400 kHz |
|                                       | L401 600 kHz    |

**MW/SW1/SW2 OSC Voltage Adjustment**

**Procedure:**

- Set BAND selector switch to MW.
- Push TUNING (+, -) button for 530 kHz. Adjust L402 for 0.95 – 1.05 V VOM ② reading.
- Push the button for 1,610 kHz. Adjust CT402 for 8.9 – 9.0 V VOM ② reading.
- Set BAND selector switch to SW1.
- Push TUNING (+, -) button for 3.2 MHz. Adjust L403 for 0.95 – 1.05 V VOM ① reading.
- Push the button for 7.3 MHz. Adjust CT404 for 8.9 – 9.0 V VOM ① reading.
- Set BAND selector switch to SW2.



- Push TUNING (+, -) button for 9.5 MHz. Adjust L404 for 0.95 – 1.05 V VOM ① reading.
- Push the button for 21.75 MHz. Adjust CT406 for 8.9 – 9.0 V VOM ① reading.

### 3-1. MOUNTING DIAGRAM

- See page ST-11 for notes.

## **SECTION 3**

### **DIAGRAMS**

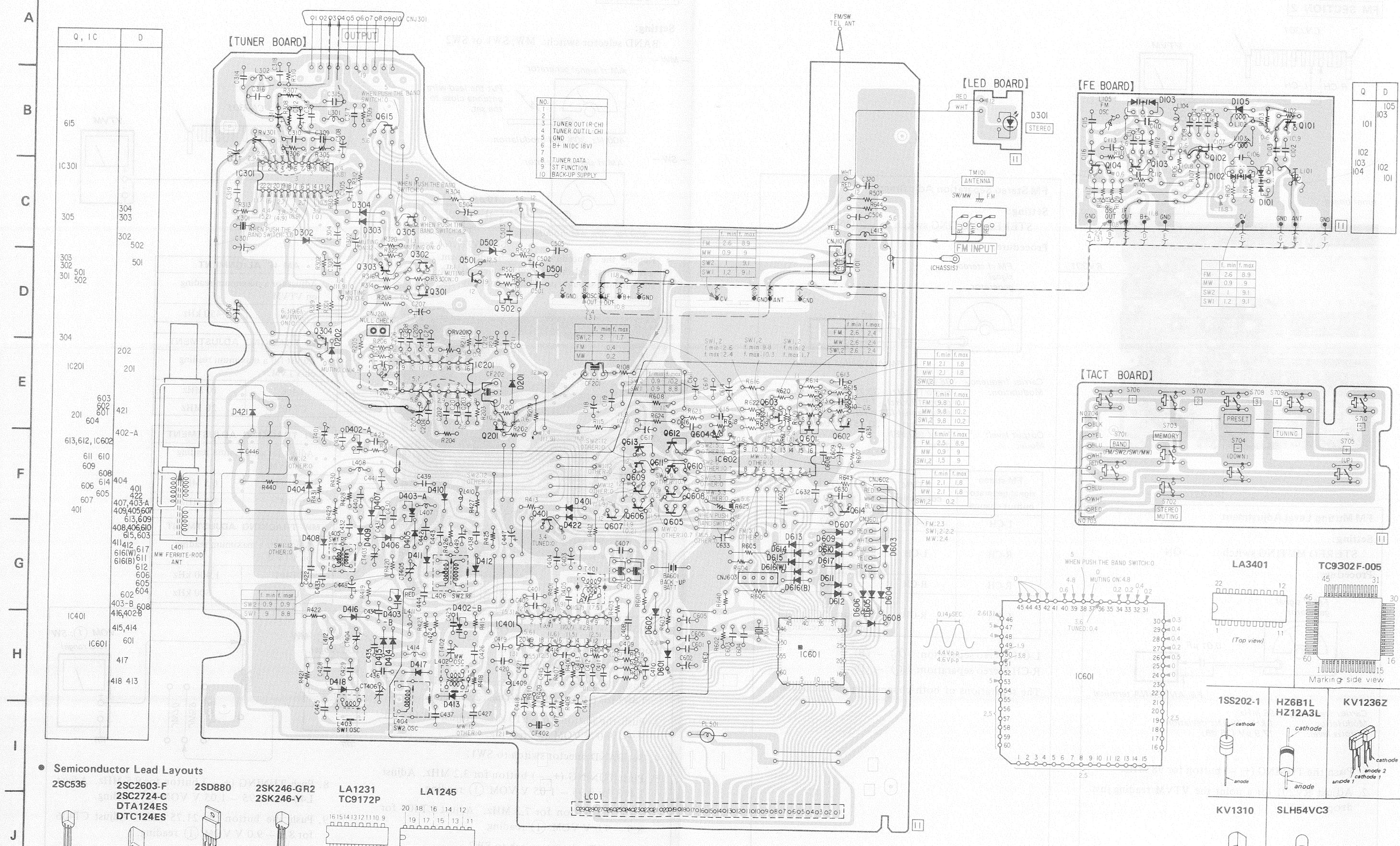
(E model)

**FH-150R**

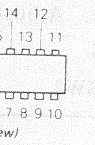
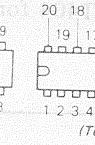
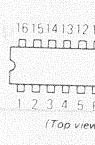
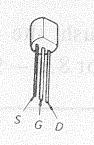
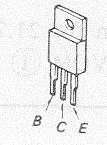
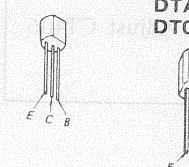
**FH-150R**      **FH-150R**  
**ST-177R**      **ST-177R**

(E model

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15



- Semiconductor Lead Layouts



### 3-1. MOUNTING DIAGRAM

- Conductor Side
- See page ST-11 for notes.

### SECTION 3 DIAGRAMS

FH-15OR

ST-177R

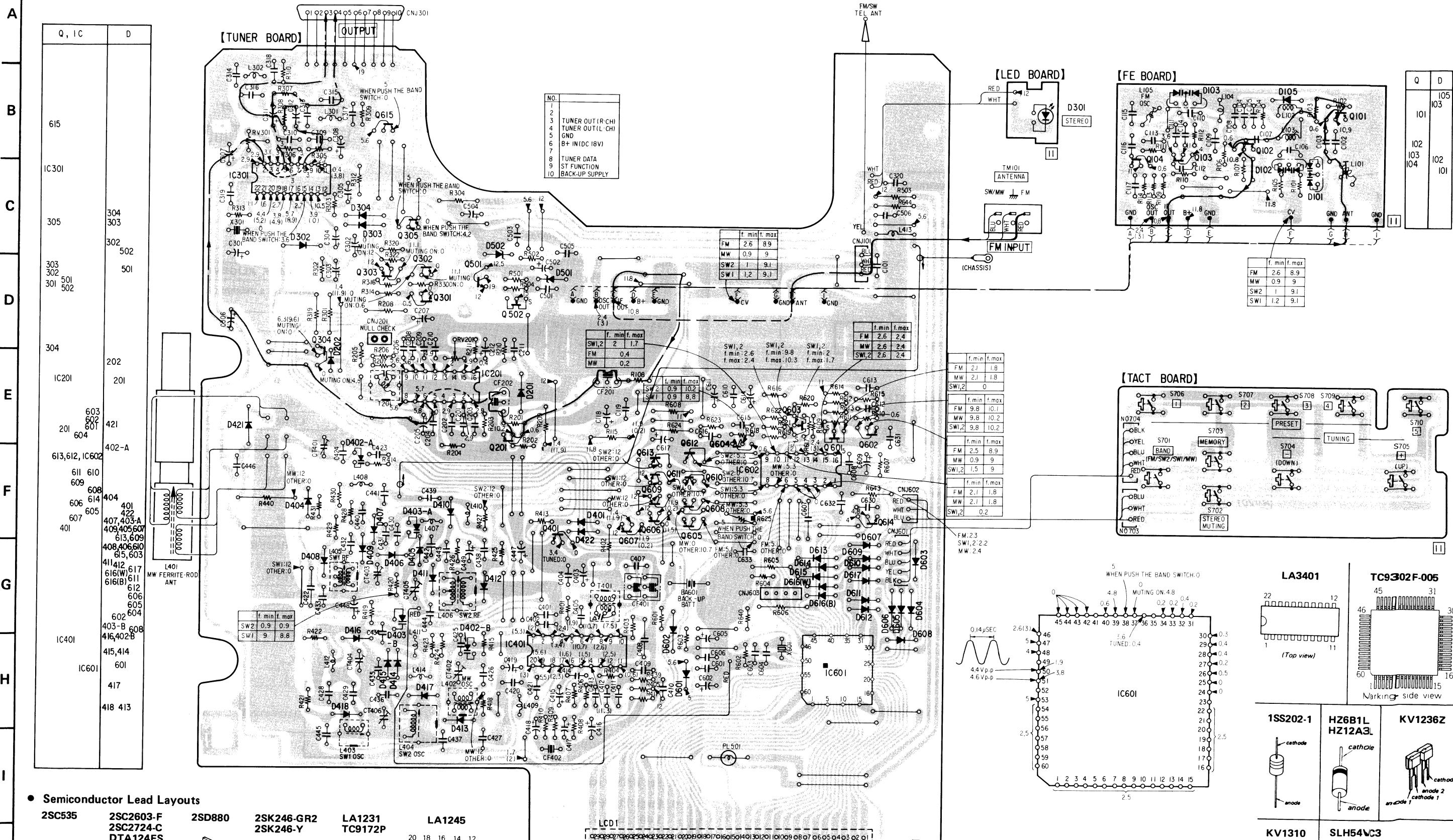
FH-15OR

ST-177R

(E model)

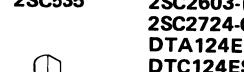
(E model)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15



#### • Semiconductor Lead Layouts

2SC535



2SD880



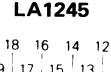
2SK246-GR2



LA1231



TC9172P



LA1245



LCD1



PL501



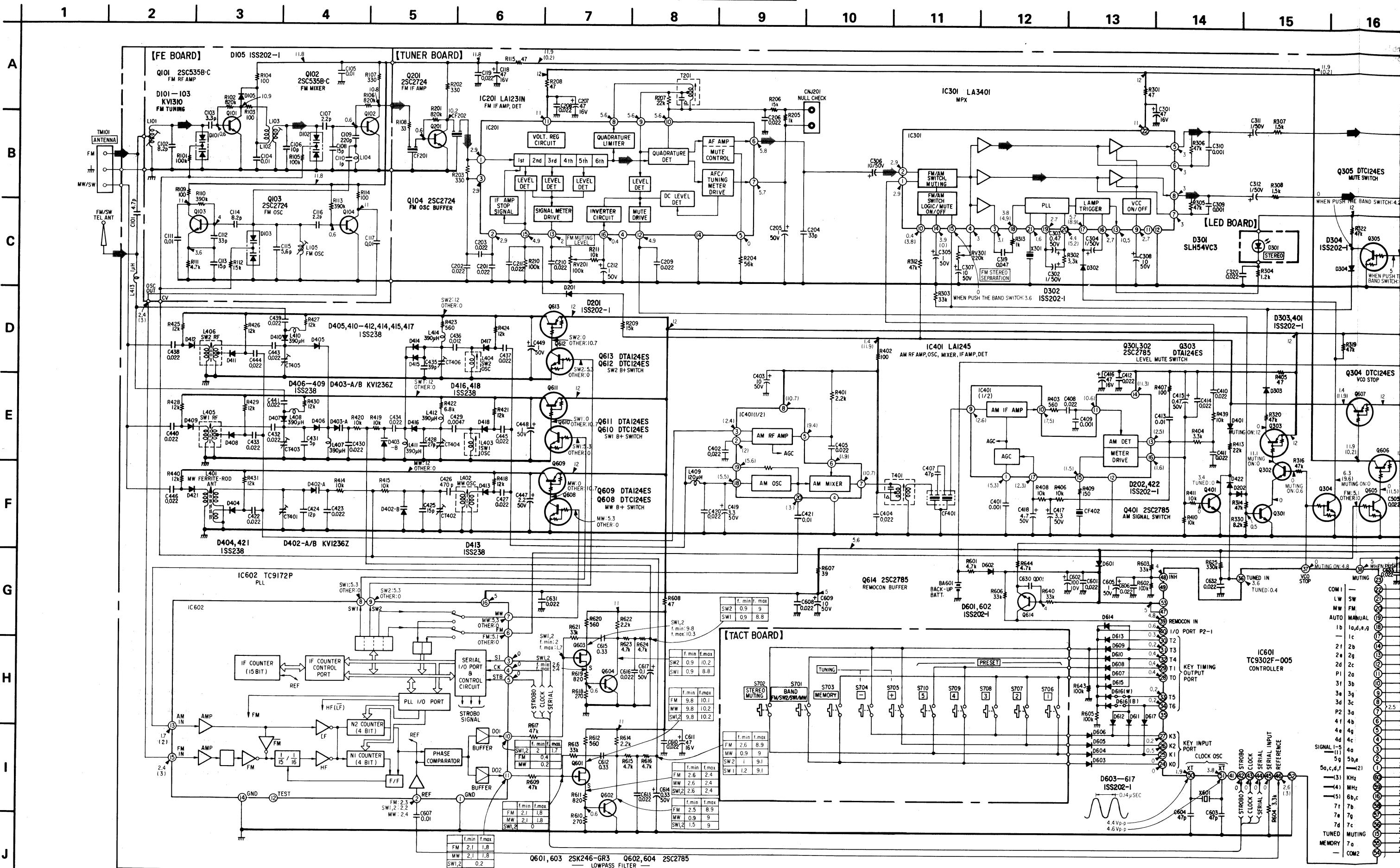
### **3-2. SCHEMATIC DIAGRAM**

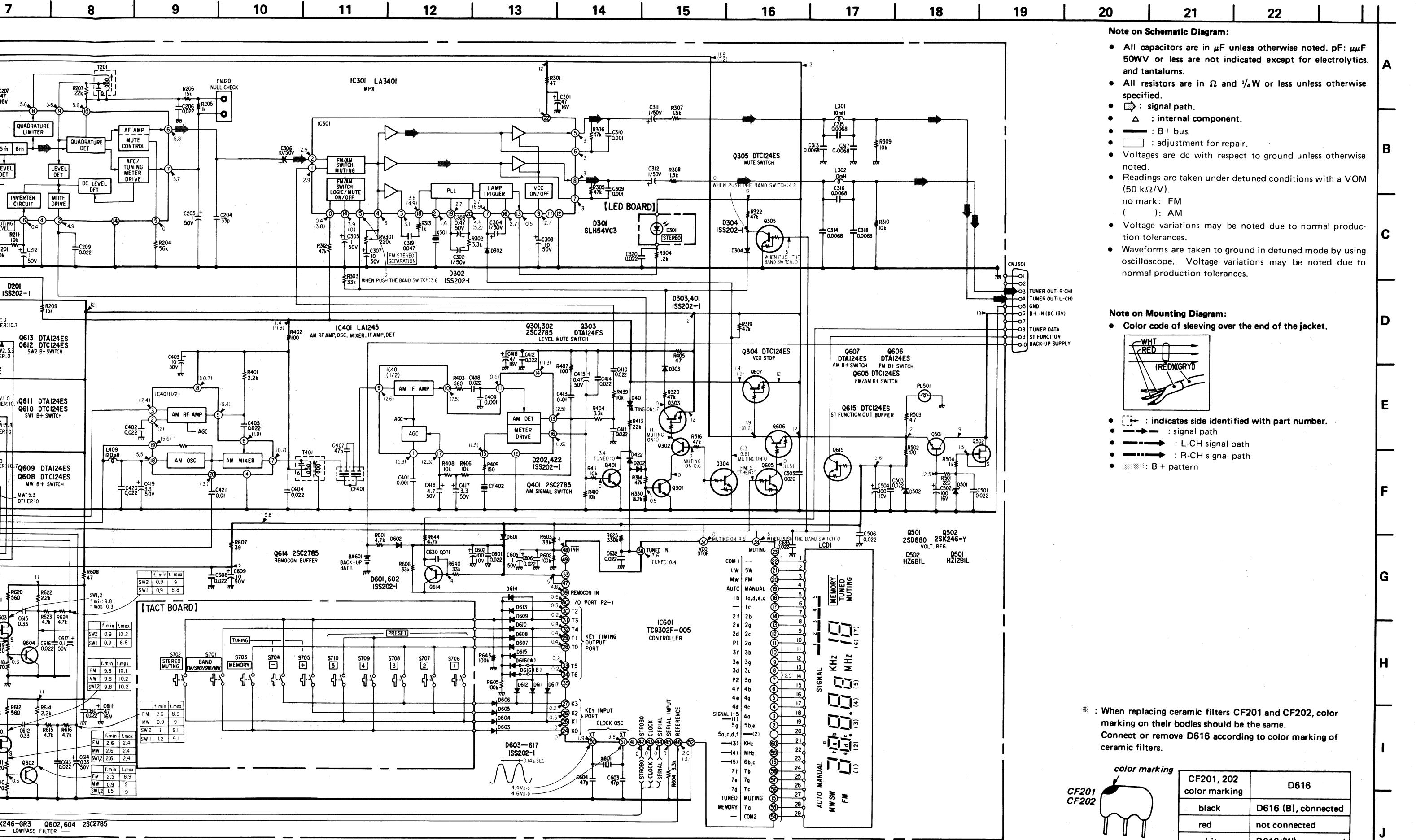
E model)

**FH-150R  
ST-177R**

**FH-150R  
ST-177R**

(E model)





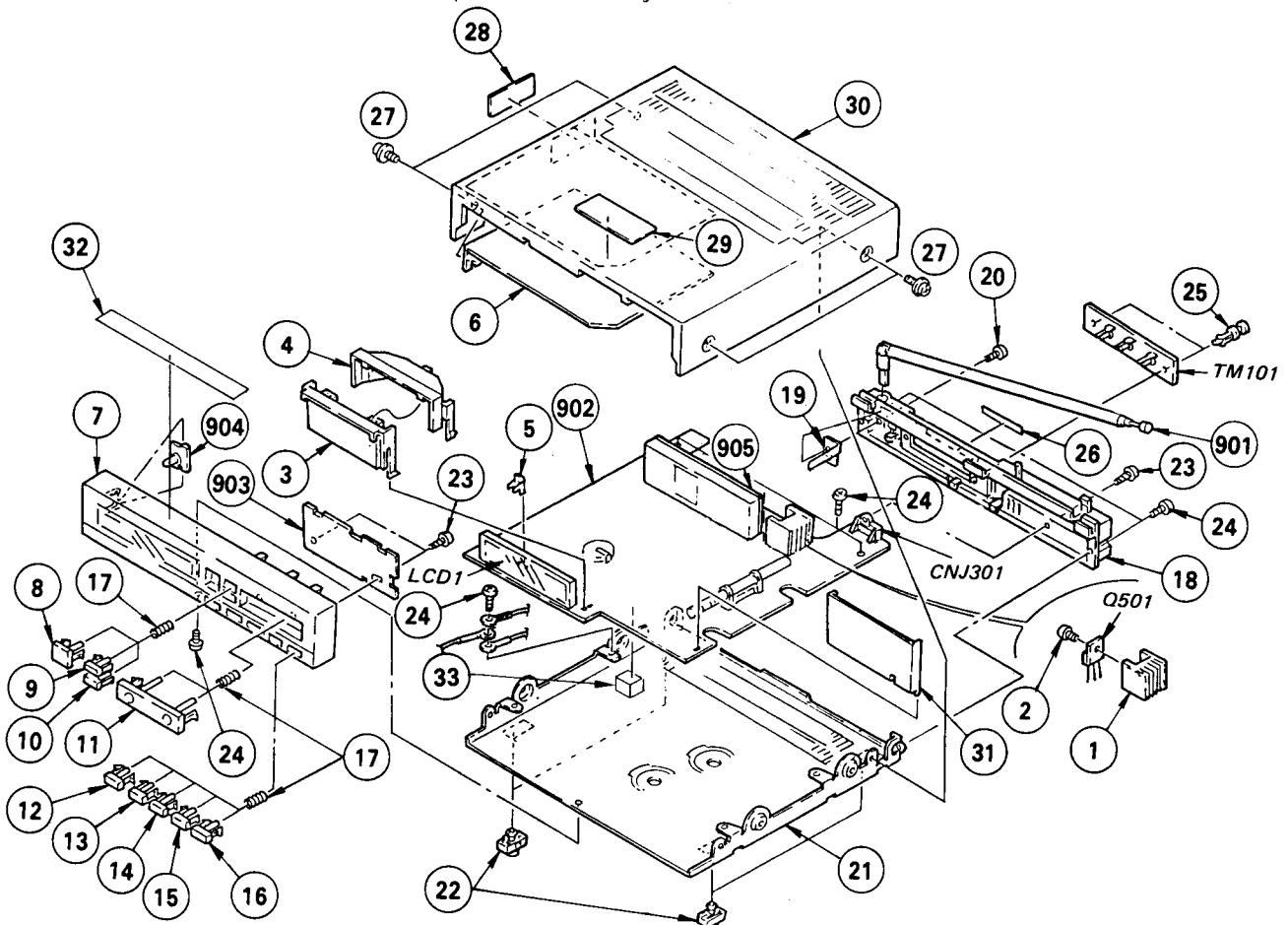
## SECTION 4

## EXPLODED VIEW AND PARTS LIST

**NOTE:**  
The mechanical parts with no reference number in the exploded views are not supplied.

Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The construction parts of an assembled part are indicated with a collation number in the remark column.



| No. | Part No.      | Description                        | Remarks | No.    | Part No.      | Description                  | Remarks |
|-----|---------------|------------------------------------|---------|--------|---------------|------------------------------|---------|
| 1   | *4-363-146-21 | HEAT SINK, V.OUT                   |         | 22     | X-4902-937-1  | FOOT ASSY, RUBBER            |         |
| 2   | 7-685-646-81  | SCREW +BV 3X8 (S)                  |         | 23     | 7-685-646-71  | SCREW +BVTP 3X8 TYPE2 N-S    |         |
| 3   | *4-909-633-01 | ILLUMINATOR                        |         | 24     | 7-685-871-01  | SCREW +BVTT 3X6 (S)          |         |
| 4   | *4-904-515-01 | HOUSE, LAMP                        |         | 25     | 4-829-039-00  | RIVET, NYLON                 |         |
| 5   | *4-904-507-01 | BLIND, LAMP                        |         | 26     | *4-910-083-01 | LABEL, ANTENNA               |         |
| 6   | *4-910-337-01 | PLATE, SHIELD                      |         | 27     | 4-886-821-21  | SCREW, M3 CASE STOPPER       |         |
| 7   | X-4910-083-1  | PANEL ASSY, FRONT                  |         | 28     | *4-914-317-01 | LABEL, MODEL NUMBER          |         |
| 8   | 4-910-093-11  | BUTTON, SQUARE (BAND)              |         | 29     | 4-884-927-00  | LABEL (SYSTEM), CAUTION      |         |
| 9   | 4-910-087-01  | BUTTON (B), SQUARE (STEREO MUTING) |         | 30     | X-4902-904-1  | CASE ASSY (BLACK)            |         |
| 10  | 4-910-087-71  | BUTTON (B), SQUARE (MEMORY)        |         | 31     | *4-910-090-01 | PLATE, SHIELD                |         |
| 11  | 4-910-094-11  | BUTTON, SQUARE (TUNING)            |         | 32     | 4-884-873-00  | SEAL, INDICATION, METER BAND |         |
| 12  | 4-914-314-01  | BUTTON, SQUARE (PRESET 1)          |         | 33     | 9-911-842-XX  | CUSHION                      |         |
| 13  | 4-914-314-11  | BUTTON, SQUARE (PRESET 2)          |         | 901    | 1-501-321-11  | ANTENNA, TELESCOPIC          |         |
| 14  | 4-914-314-21  | BUTTON, SQUARE (PRESET 3)          |         | 902    | *A-4351-441-A | MOUNTED PCB, TUNER           |         |
| 15  | 4-914-314-31  | BUTTON, SQUARE (PRESET 4)          |         | 903    | *1-615-520-11 | PC BOARD, TACT               |         |
| 16  | 4-914-314-41  | BUTTON, SQUARE (PRESET 5)          |         | 904    | *1-615-521-11 | PC BOARD, LED                |         |
| 17  | 4-886-032-00  | SPRING, COMPRESSION                |         | 905    | *1-615-522-11 | PC BOARD, F.E                |         |
| 18  | 4-910-098-01  | PLATE, JACK                        |         | CNJ301 | 1-562-479-12  | SOCKET, CONNECTOR 10P        |         |
| 19  | *4-910-081-01 | TERMINAL BOARD, ROD ANTENNA        |         | LCD1   | 1-806-874-11  | INDICATOR, L-CRYSTAL LT5056  |         |
| 20  | 7-682-548-09  | SCREW +B 3X8                       |         | Q501   | 8-729-288-02  | TRANSISTOR 2SD880            |         |
| 21  | *4-902-941-21 | CHASSIS                            |         | TM101  | 1-536-901-11  | TERMINAL BOARD 3P (ANTENNA)  |         |

## SECTION 5

## ELECTRICAL PARTS LIST

## NOTE:

Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:  
MF:μF, PF:μμF.

## RESISTORS

All resistors are in ohms.  
F : nonflammable

## COILS

MMH : mH, UH : μH

## SEMICONDUCTORS

In each case, U : μ, for example:  
UA...: μA..., UPA...: μPA..., UPC...: μPC,  
UPD...: μPD...

| ELECTRICAL PARTS |               |                            | ELECTRICAL PARTS |              |             |          |     |     |
|------------------|---------------|----------------------------|------------------|--------------|-------------|----------|-----|-----|
| Ref.No.          | Part No.      | Description                | Ref.No.          | Part No.     | Description |          |     |     |
| 901              | 1-501-321-11  | ANTENNA, TELESCOPIC        | C309             | 1-162-294-31 | CERAMIC     | 0.001MF  | 10% | 50V |
| 902              | *A-4351-441-A | MOUNTED PCB, TUNER         | C310             | 1-162-294-31 | CERAMIC     | 0.001MF  | 10% | 50V |
| 903              | *1-615-520-11 | PC BOARD, TACT             | C311             | 1-123-380-00 | ELECT       | 1MF      | 20% | 50V |
| 904              | *1-615-521-11 | PC BOARD, LED              | C312             | 1-123-380-00 | ELECT       | 1MF      | 20% | 50V |
| 905              | *1-615-522-11 | PC BOARD, F.E              | C313             | 1-162-305-31 | CERAMIC     | 0.0068MF | 20% | 16V |
| BA601            | 1-528-120-00  | BATTERY, LITHIUM (CR-2025) | C314             | 1-162-305-31 | CERAMIC     | 0.0068MF | 20% | 16V |
| C101             | 1-162-195-31  | CERAMIC                    | C315             | 1-162-305-31 | CERAMIC     | 0.0068MF | 20% | 16V |
| C102             | 1-162-198-31  | CERAMIC                    | C316             | 1-162-305-31 | CERAMIC     | 0.0068MF | 20% | 16V |
| C103             | 1-162-193-31  | CERAMIC                    | C317             | 1-162-305-31 | CERAMIC     | 0.0068MF | 20% | 16V |
| C104             | 1-162-306-31  | CERAMIC                    | C318             | 1-162-305-31 | CERAMIC     | 0.0068MF | 20% | 16V |
| C105             | 1-162-306-31  | CERAMIC                    | C319             | 1-130-491-00 | MYLAR       | 0.047MF  | 5%  | 50V |
| C106             | 1-162-199-31  | CERAMIC                    | C320             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C107             | 1-162-191-31  | CERAMIC                    | C401             | 1-162-294-31 | CERAMIC     | 0.001MF  | 10% | 50V |
| C108             | 1-162-203-31  | CERAMIC                    | C402             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C109             | 1-162-286-31  | CERAMIC                    | C403             | 1-123-356-00 | ELECT       | 10MF     | 20% | 50V |
| C110             | 1-162-187-31  | CERAMIC                    | C404             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C111             | 1-162-306-31  | CERAMIC                    | C405             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C112             | 1-162-211-31  | CERAMIC                    | C407             | 1-162-215-31 | CERAMIC     | 47PF     | 5%  | 50V |
| C113             | 1-162-203-31  | CERAMIC                    | C408             | 1-161-494-00 | CERAMIC     | 0.022MF  | 30% | 25V |
| C114             | 1-162-198-31  | CERAMIC                    | C409             | 1-162-294-31 | CERAMIC     | 0.001MF  | 10% | 50V |
| C115             | 1-162-196-31  | CERAMIC                    | C410             | 1-130-487-00 | MYLAR       | 0.022MF  | 5%  | 50V |
| C116             | 1-162-191-31  | CERAMIC                    | C411             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C117             | 1-162-306-31  | CERAMIC                    | C412             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C118             | 1-123-332-00  | ELECT                      | C413             | 1-162-306-31 | CERAMIC     | 0.01MF   | 20% | 16V |
| C119             | 1-101-005-00  | CERAMIC                    | C414             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C201             | 1-101-005-00  | CERAMIC                    | C415             | 1-123-379-00 | ELECT       | 0.47MF   | 20% | 50V |
| C202             | 1-101-005-00  | CERAMIC                    | C416             | 1-123-332-00 | ELECT       | 47MF     | 20% | 16V |
| C203             | 1-101-005-00  | CERAMIC                    | C417             | 1-123-382-00 | ELECT       | 3.3MF    | 20% | 50V |
| C204             | 1-162-211-31  | CERAMIC                    | C418             | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 50V |
| C205             | 1-123-380-00  | ELECT                      | C419             | 1-123-382-00 | ELECT       | 3.3MF    | 20% | 50V |
| C206             | 1-101-005-00  | CERAMIC                    | C420             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C207             | 1-123-332-00  | ELECT                      | C421             | 1-162-306-31 | CERAMIC     | 0.01MF   | 20% | 16V |
| C208             | 1-101-005-00  | CERAMIC                    | C422             | 1-161-494-00 | CERAMIC     | 0.022MF  | 30% | 25V |
| C209             | 1-101-005-00  | CERAMIC                    | C423             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C210             | 1-101-005-00  | CERAMIC                    | C424             | 1-102-949-00 | CERAMIC     | 12PF     | 5%  | 50V |
| C211             | 1-101-005-00  | CERAMIC                    | C425             | 1-102-880-00 | CERAMIC     | 15PF     | 5%  | 50V |
| C212             | 1-123-380-00  | ELECT                      | C426             | 1-104-069-00 | POLYSTYRENE | 470PF    | 5%  | 50V |
| C213             | 1-123-332-00  | ELECT                      | C427             | 1-101-005-00 | CERAMIC     | 0.022MF  | 50V |     |
| C214             | 1-123-380-00  | ELECT                      | C428             | 1-102-803-00 | CERAMIC     | 27PF     | 5%  | 50V |
| C215             | 1-101-005-00  | CERAMIC                    | C429             | 1-103-741-00 | STYROL      | 0.0047MF | 5%  | 50V |
| C216             | 1-101-005-00  | CERAMIC                    | C430</           |              |             |          |     |     |

## SECTION 5

(E model)

FH-15OR  
ST-177RFH-15OR  
ST-177R

(E model)

**NOTE:**  
 Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:  
 MF:  $\mu$ F, PF:  $\mu$ PF.

## RESISTORS

All resistors are in ohms.  
 F : nonflammable

## COILS

MMH : mH, UH :  $\mu$ H

## SEMICONDUCTORS

In each case, U :  $\mu$ , for example:  
 UA...:  $\mu$ A..., UPA...:  $\mu$ PA..., UPC...:  $\mu$ PC,  
 UPD...:  $\mu$ PD...

## ELECTRICAL PARTS

| Ref.No. | Part No.      | Description                |
|---------|---------------|----------------------------|
| 901     | 1-501-321-11  | ANTENNA, TELESCOPIC        |
| 902     | *A-4351-441-A | MOUNTED PCB, TUNER         |
| 903     | *1-615-520-11 | PC BOARD, TACT             |
| 904     | *1-615-521-11 | PC BOARD, LED              |
| 905     | *1-615-522-11 | PC BOARD, F.E              |
| BA601   | 1-528-120-00  | BATTERY, LITHIUM (CR-2025) |
| C101    | 1-162-195-31  | CERAMIC 4.7PF 10% 50V      |
| C102    | 1-162-198-31  | CERAMIC 8.2PF 10% 50V      |
| C103    | 1-162-193-31  | CERAMIC 3.3PF 10% 50V      |
| C104    | 1-162-306-31  | CERAMIC 0.01MF 20% 16V     |
| C105    | 1-162-306-31  | CERAMIC 0.01MF 20% 16V     |
| C106    | 1-162-199-31  | CERAMIC 10PF 5% 50V        |
| C107    | 1-162-191-31  | CERAMIC 2.2PF 10% 50V      |
| C108    | 1-162-203-31  | CERAMIC 15PF 5% 50V        |
| C109    | 1-162-286-31  | CERAMIC 220PF 10% 50V      |
| C110    | 1-162-187-31  | CERAMIC 1PF 20% 50V        |
| C111    | 1-162-306-31  | CERAMIC 0.01MF 20% 16V     |
| C112    | 1-162-211-31  | CERAMIC 33PF 5% 50V        |
| C113    | 1-162-203-31  | CERAMIC 15PF 5% 50V        |
| C114    | 1-162-198-31  | CERAMIC 8.2PF 10% 50V      |
| C115    | 1-162-196-31  | CERAMIC 5.6PF 10% 50V      |
| C116    | 1-162-191-31  | CERAMIC 2.2PF 20% 50V      |
| C117    | 1-162-306-31  | CERAMIC 0.01MF 20% 16V     |
| C118    | 1-123-332-00  | ELECT 47MF 20% 16V         |
| C119    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C201    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C202    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C203    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C204    | 1-162-211-31  | CERAMIC 33PF 5% 50V        |
| C205    | 1-123-380-00  | ELECT 1MF 20% 50V          |
| C206    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C207    | 1-123-332-00  | ELECT 47MF 20% 16V         |
| C208    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C209    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C210    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C211    | 1-101-005-00  | CERAMIC 0.022MF 50V        |
| C212    | 1-123-380-00  | ELECT 1MF 20% 50V          |
| C301    | 1-123-332-00  | ELECT 47MF 20% 16V         |
| C302    | 1-123-380-00  | ELECT 1MF 20% 50V          |
| C303    | 1-123-379-00  | ELECT 0.47MF 20% 50V       |
| C304    | 1-123-380-00  | ELECT 1MF 20% 50V          |
| C305    | 1-123-380-00  | ELECT 1MF 20% 50V          |
| C306    | 1-123-356-00  | ELECT 10MF 20% 50V         |
| C307    | 1-123-356-00  | ELECT 10MF 20% 50V         |
| C308    | 1-123-356-00  | ELECT 10MF 20% 50V         |

## ELECTRICAL PARTS

| Ref.No.             | Part No.     | Description                          |
|---------------------|--------------|--------------------------------------|
| C309                | 1-162-294-31 | CERAMIC 0.001MF 10% 50V              |
| C310                | 1-162-294-31 | CERAMIC 0.001MF 10% 50V              |
| C311                | 1-123-380-00 | ELECT 1MF 20% 50V                    |
| C312                | 1-123-380-00 | ELECT 1MF 20% 50V                    |
| C313                | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V             |
| C314                | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V             |
| C315                | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V             |
| C316                | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V             |
| C317                | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V             |
| C318                | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V             |
| C319                | 1-130-491-00 | MYLAR 0.047MF 5% 50V                 |
| C320                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C401                | 1-162-294-31 | CERAMIC 0.001MF 10% 50V              |
| C402                | 1-101-005-00 | CERAMIC 0.022MF 20% 50V              |
| C403                | 1-123-356-00 | ELECT 10MF 20% 50V                   |
| C404                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C405                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C407                | 1-162-215-31 | CERAMIC 47PF 5% 50V                  |
| C408                | 1-161-494-00 | CERAMIC 0.022MF 30% 25V              |
| C409                | 1-162-294-31 | CERAMIC 0.001MF 10% 50V              |
| C410                | 1-130-487-00 | MYLAR 0.022MF 5% 50V                 |
| C411                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C412                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C413                | 1-162-306-31 | CERAMIC 0.01MF 20% 16V               |
| C414                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C415                | 1-123-379-00 | ELECT 0.47MF 20% 50V                 |
| C416                | 1-123-332-00 | ELECT 47MF 20% 16V                   |
| C417                | 1-123-382-00 | ELECT 3.3MF 20% 50V                  |
| C418                | 1-123-369-00 | ELECT 4.7MF 20% 50V                  |
| C419                | 1-123-382-00 | ELECT 3.3MF 20% 50V                  |
| C420                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C421                | 1-162-306-31 | CERAMIC 0.01MF 20% 16V               |
| C422                | 1-161-494-00 | CERAMIC 0.022MF 30% 25V              |
| C423                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C424                | 1-102-949-00 | CERAMIC 12PF 5% 50V                  |
| C425                | 1-102-880-00 | CERAMIC 15PF 5% 50V                  |
| C426                | 1-104-069-00 | POLYSTYRENE 470PF 5% 50V             |
| C427                | 1-101-005-00 | CERAMIC 0.022MF 5% 50V               |
| C428                | 1-102-803-00 | CERAMIC 27PF 5% 50V                  |
| C429                | 1-103-741-00 | STYROL 0.0047MF 5% 50V               |
| C430                | 1-101-005-00 | CERAMIC 0.022MF 5% 50V               |
| C431                | 1-102-942-00 | CERAMIC 5PF 5% 50V                   |
| C432                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C433                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C434                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C440                | 1-102-754-00 | CERAMIC 39PF 5% 50V                  |
| C441                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C442                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C443                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C444                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C445                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C446                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C447                | 1-123-381-00 | ELECT 2.2MF 20% 50V                  |
| C448                | 1-123-380-00 | ELECT 1MF 20% 50V                    |
| C449                | 1-123-380-00 | ELECT 1MF 20% 50V                    |
| C501                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C502                | 1-123-333-00 | ELECT 100MF 20% 16V                  |
| C503                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C504                | 1-123-307-00 | ELECT 100MF 20% 10V                  |
| C505                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C506                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C601                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C602                | 1-123-307-00 | ELECT 100MF 20% 10V                  |
| C603                | 1-102-852-00 | CERAMIC 47PF 5% 50V                  |
| C604                | 1-102-852-00 | CERAMIC 47PF 5% 50V                  |
| C605                | 1-123-380-00 | ELECT 1MF 20% 50V                    |
| C606                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C607                | 1-162-306-31 | CERAMIC 0.01MF 20% 16V               |
| C608                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C609                | 1-123-356-00 | ELECT 10MF 20% 50V                   |
| C610                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C611                | 1-123-332-00 | ELECT 47MF 20% 16V                   |
| C612                | 1-136-171-00 | FILM 0.33MF 5% 50V                   |
| C613                | 1-130-487-00 | MYLAR 0.022MF 5% 50V                 |
| C614                | 1-123-609-00 | ELECT 0.33MF 20% 50V                 |
| C615                | 1-136-171-00 | FILM 0.33MF 5% 50V                   |
| C616                | 1-130-487-00 | MYLAR 0.022MF 5% 50V                 |
| C617                | 1-123-607-00 | ELECT 0.1MF 20% 50V                  |
| C630                | 1-162-294-31 | CERAMIC 0.001MF 10% 50V              |
| C631                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C632                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C633                | 1-101-005-00 | CERAMIC 0.022MF 50V                  |
| C634                | 1-161-494-00 | CERAMIC 0.022MF 30% 25V              |
| C635                | 1-101-006-00 | CERAMIC 0.047MF 50V                  |
| CF201               | 1-527-968-00 | FILTER, CERAMIC                      |
| CF202               | 1-527-968-00 | FILTER, CERAMIC                      |
| CF401               | 1-527-937-00 | FILTER, CERAMIC                      |
| CF402               | 1-527-981-00 | FILTER, CERAMIC                      |
| CNJ101*1-562-327-00 |              | SOCKET, CONNECTOR 3P                 |
| CNJ201*1-560-060-00 |              | PIN, CONNECTOR 2P (NULL CHECK POINT) |

| ELECTRICAL PARTS |               |                             | ELECTRICAL PARTS |              |             |      |           |
|------------------|---------------|-----------------------------|------------------|--------------|-------------|------|-----------|
| Ref.No.          | Part No.      | Description                 | Ref.No.          | Part No.     | Description |      |           |
| L105             | *1-459-396-00 | COIL (WITH CORE)            | R113             | 1-247-893-00 | CARBON      | 390K | 5% 1/6W   |
| L301             | 1-408-924-00  | MICRO INDUCTOR 10MMH        | R114             | 1-249-405-11 | CARBON      | 100  | 5% 1/6W   |
| L302             | 1-408-924-00  | MICRO INDUCTOR 10MMH        | R115             | 1-247-799-00 | CARBON      | 47   | 5% 1/4W F |
| L401             | 1-402-152-11  | ANTENNA, FERRITE-ROD (MW)   | R201             | 1-247-901-00 | CARBON      | 820K | 5% 1/6W   |
| L402             | 1-406-089-11  | COIL (OSC)                  | R202             | 1-247-819-00 | CARBON      | 330  | 5% 1/6W   |
| L403             | 1-405-955-00  | COIL (OSC)                  | R203             | 1-247-819-00 | CARBON      | 330  | 5% 1/6W   |
| L404             | 1-406-106-11  | COIL (OSC) SW2              | R204             | 1-247-873-00 | CARBON      | 56K  | 5% 1/6W   |
| L405             | 1-401-910-00  | COIL (ANT)                  | R205             | 1-247-831-00 | CARBON      | 1K   | 5% 1/6W   |
| L406             | 1-401-985-00  | COIL (ANT)                  | R206             | 1-247-859-00 | CARBON      | 15K  | 5% 1/6W   |
| L407             | 1-408-202-00  | MICRO INDUCTOR 390UH        | R207             | 1-249-433-11 | CARBON      | 22K  | 5% 1/6W   |
| L408             | 1-408-202-00  | MICRO INDUCTOR 390UH        | R208             | 1-247-799-00 | CARBON      | 47   | 5% 1/4W   |
| L409             | 1-408-196-00  | MICRO INDUCTOR 120UH        | R209             | 1-247-859-00 | CARBON      | 15K  | 5% 1/6W   |
| L410             | 1-408-202-00  | MICRO INDUCTOR 390UH        | R210             | 1-249-441-11 | CARBON      | 100K | 5% 1/6W   |
| L411             | 1-408-202-00  | MICRO INDUCTOR 390UH        | R211             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| L412             | 1-408-202-00  | MICRO INDUCTOR 390UH        | R301             | 1-247-799-00 | CARBON      | 47   | 5% 1/6W   |
| L413             | 1-408-551-00  | MICRO INDUCTOR 1UH          | R302             | 1-249-423-00 | CARBON      | 3.3K | 5% 1/6W   |
| L414             | 1-408-202-00  | MICRO INDUCTOR 390UH        | R303             | 1-249-435-11 | CARBON      | 33K  | 5% 1/6W   |
| LCD1             | 1-806-874-11  | INDICATOR, L-CRYSTAL LT5056 | R304             | 1-247-833-00 | CARBON      | 1.2K | 5% 1/6W   |
| PL501            | 1-518-511-21  | LAMP, PILOT, YELLOW         | R305             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q101             | 8-729-353-52  | TRANSISTOR 2SC535           | R306             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q102             | 8-729-353-52  | TRANSISTOR 2SC535           | R307             | 1-249-419-11 | CARBON      | 1.5K | 5% 1/6W   |
| Q103             | 8-729-672-42  | TRANSISTOR 2SC2724-C        | R308             | 1-249-419-11 | CARBON      | 1.5K | 5% 1/6W   |
| Q104             | 8-729-672-42  | TRANSISTOR 2SC2724-C        | R309             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q201             | 8-729-672-42  | TRANSISTOR 2SC2724-C        | R310             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q301             | 8-729-606-33  | TRANSISTOR 2SC2603-F        | R312             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q302             | 8-729-606-33  | TRANSISTOR 2SC2603-F        | R313             | 1-247-831-00 | CARBON      | 1K   | 5% 1/6W   |
| Q303             | 8-729-900-63  | TRANSISTOR DTA124ES         | R314             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q304             | 8-729-900-36  | TRANSISTOR DTC124ES         | R316             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q305             | 8-729-900-36  | TRANSISTOR DTC124ES         | R319             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q401             | 8-729-606-33  | TRANSISTOR 2SC2603-F        | R320             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q501             | 8-729-288-02  | TRANSISTOR 2SD880           | R322             | 1-249-437-11 | CARBON      | 47K  | 5% 1/6W   |
| Q502             | 8-729-224-61  | TRANSISTOR 2SK246-Y         | R330             | 1-247-853-00 | CARBON      | 8.2K | 5% 1/6W   |
| Q601             | 8-729-201-56  | TRANSISTOR 2SK246-GR2       | R401             | 1-249-421-11 | CARBON      | 2.2K | 5% 1/6W   |
| Q602             | 8-729-606-33  | TRANSISTOR 2SC2603-F        | R402             | 1-249-405-11 | CARBON      | 100  | 5% 1/6W   |
| Q603             | 8-729-201-56  | TRANSISTOR 2SK246-GR2       | R403             | 1-247-825-00 | CARBON      | 560  | 5% 1/6W   |
| Q604             | 8-729-606-33  | TRANSISTOR 2SC2603-F        | R404             | 1-249-423-00 | CARBON      | 3.3K | 5% 1/6W   |
| Q605             | 8-729-900-36  | TRANSISTOR DTC124ES         | R405             | 1-247-799-00 | CARBON      | 47   | 5% 1/6W   |
| Q606             | 8-729-900-63  | TRANSISTOR DTA124ES         | R406             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q607             | 8-729-900-63  | TRANSISTOR DTA124ES         | R407             | 1-249-405-11 | CARBON      | 100  | 5% 1/6W   |
| Q608             | 8-729-900-36  | TRANSISTOR DTC124ES         | R408             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q609             | 8-729-900-63  | TRANSISTOR DTA124ES         | R409             | 1-247-811-00 | CARBON      | 150  | 5% 1/6W   |
| Q610             | 8-729-900-36  | TRANSISTOR DTC124ES         | R410             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q611             | 8-729-900-63  | TRANSISTOR DTA124ES         | R411             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q612             | 8-729-900-36  | TRANSISTOR DTC124ES         | R412             | 1-247-859-00 | CARBON      | 15K  | 5% 1/6W   |
| Q613             | 8-729-900-63  | TRANSISTOR DTA124ES         | R413             | 1-249-433-11 | CARBON      | 22K  | 5% 1/6W   |
| Q614             | 8-729-606-33  | TRANSISTOR 2SC2603-F        | R414             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| Q615             | 8-729-900-36  | TRANSISTOR DTC124ES         | R415             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| R101             | 1-249-441-11  | CARBON 100K 5% 1/6W         | R418             | 1-247-857-00 | CARBON      | 12K  | 5% 1/6W   |
| R102             | 1-247-901-00  | CARBON 820K 5% 1/6W         | R419             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| R103             | 1-249-405-11  | CARBON 100 5% 1/6W          | R420             | 1-249-429-11 | CARBON      | 10K  | 5% 1/6W   |
| R104             | 1-249-405-11  | CARBON 100 5% 1/6W          | R421             | 1-247-857-00 | CARBON      | 12K  | 5% 1/6W   |
| R105             | 1-249-441-11  | CARBON 100K 5% 1/6W         | R422             | 1-247-851-00 | CARBON      | 6.8K | 5% 1/6W   |
| R106             | 1-247-901-00  | CARBON 820K 5% 1/6W         | R423             | 1-247-825-00 | CARBON      | 560  | 5% 1/6W   |
| R107             | 1-247-819-00  | CARBON 330 5% 1/6W          | R424             | 1-247-857-00 | CARBON      | 12K  | 5% 1/6W   |
| R108             | 1-247-795-00  | CARBON 33 5% 1/6W           | R425             | 1-247-857-00 | CARBON      | 12K  | 5% 1/6W   |
| R109             | 1-249-405-11  | CARBON 100 5% 1/6W          | R426             | 1-247-857-00 | CARBON      | 12K  | 5% 1/6W   |
| R110             | 1-247-893-00  | CARBON 390K 5% 1/6W         | R427             | 1-247-857-00 | CARBON      | 12K  | 5% 1/6W   |
| R111             | 1-249-425-11  | CARBON 4.7K 5% 1/6W         |                  |              |             |      |           |
| R112             | 1-247-859-00  | CARBON 15K 5% 1/6W          |                  |              |             |      |           |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description      |      |    |      |
|---------|--------------|------------------|------|----|------|
| R428    | 1-247-857-00 | CARBON           | 12K  | 5% | 1/6W |
| R429    | 1-247-857-00 | CARBON           | 12K  | 5% | 1/6W |
| R430    | 1-247-857-00 | CARBON           | 12K  | 5% | 1/6W |
| R431    | 1-247-857-00 | CARBON           | 12K  | 5% | 1/6W |
| R439    | 1-249-429-11 | CARBON           | 10K  | 5% | 1/6W |
| R440    | 1-247-857-00 | CARBON           | 12K  | 5% | 1/6W |
| R441    | 1-247-879-00 | CARBON           | 100K | 5% | 1/6W |
| R501    | 1-247-815-00 | CARBON           | 220  | 5% | 1/6W |
| R502    | 1-247-823-00 | CARBON           | 470  | 5% | 1/6W |
| R503    | 1-247-775-00 | CARBON           | 4.7  | 5% | 1/6W |
| R504    | 1-247-831-00 | CARBON           | 1K   | 5% | 1/6W |
| R601    | 1-249-425-11 | CARBON           | 4.7K | 5% | 1/6W |
| R602    | 1-249-441-11 | CARBON           | 100K | 5% | 1/6W |
| R603    | 1-249-435-11 | CARBON           | 33K  | 5% | 1/6W |
| R604    | 1-249-423-11 | CARBON           | 3.3K | 5% | 1/6W |
| R605    | 1-249-441-11 | CARBON           | 100K | 5% | 1/6W |
| R606    | 1-249-435-11 | CARBON           | 33K  | 5% | 1/6W |
| R607    | 1-247-797-00 | CARBON           | 39   | 5% | 1/6W |
| R608    | 1-247-799-00 | CARBON           | 47   | 5% | 1/6W |
| R609    | 1-249-437-11 | CARBON           | 47K  | 5% | 1/6W |
| R610    | 1-247-817-00 | CARBON           | 270  | 5% | 1/6W |
| R611    | 1-247-829-00 | CARBON           | 820  | 5% | 1/6W |
| R612    | 1-247-825-00 | CARBON           | 560  | 5% | 1/6W |
| R613    | 1-249-435-11 | CARBON           | 33K  | 5% | 1/6W |
| R614    | 1-249-421-11 | CARBON           | 2.2K | 5% | 1/6W |
| R615    | 1-249-425-11 | CARBON           | 4.7K | 5% | 1/6W |
| R616    | 1-249-425-11 | CARBON           | 4.7K | 5% | 1/6W |
| R617    | 1-249-437-11 | CARBON           | 47K  | 5% | 1/6W |
| R618    | 1-247-817-00 | CARBON           | 270  | 5% | 1/6W |
| R619    | 1-247-829-00 | CARBON           | 820  | 5% | 1/6W |
| R620    | 1-247-825-00 | CARBON           | 560  | 5% | 1/6W |
| R621    | 1-249-435-11 | CARBON           | 33K  | 5% | 1/6W |
| R622    | 1-249-421-11 | CARBON           | 2.2K | 5% | 1/6W |
| R623    | 1-249-425-11 | CARBON           | 4.7K | 5% | 1/6W |
| R624    | 1-249-425-11 | CARBON           | 4.7K | 5% | 1/6W |
| R625    | 1-247-891-00 | CARBON           | 330K | 5% | 1/6W |
| R640    | 1-249-435-11 | CARBON           | 33K  | 5% | 1/6W |
| R643    | 1-249-441-11 | CARBON           | 100K | 5% | 1/6W |
| R644    | 1-249-425-11 | CARBON           | 4.7K | 5% | 1/6W |
| RV201   | 1-228-997-00 | RES, ADJ, CARBON | 100K |    |      |
| RV301   | 1-228-998-00 | RES, ADJ, CARBON | 220K |    |      |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description                       |
|---------|--------------|-----------------------------------|
| S701    | 1-554-303-21 | SWITCH, KEY BOARD (BAND)          |
| S702    | 1-554-303-21 | SWITCH, KEY BOARD (STEREO MUTING) |
| S703    | 1-554-303-21 | SWITCH, KEY BOARD (MEMORY)        |
| S704    | 1-554-303-21 | SWITCH, KEY BOARD (TUNING -)      |
| S705    | 1-554-303-21 | SWITCH, KEY BOARD (TUNING +)      |
| S706    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 1)      |
| S707    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 2)      |
| S708    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 3)      |
| S709    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 4)      |
| S710    | 1-554-303-21 | SWITCH, KEY BOARD (PRESET 5)      |
| T201    | 1-404-419-00 | COIL, DISCRIMINATOR               |
| T401    | 1-404-535-11 | COIL (WITH IFT)                   |
| TM101   | 1-536-901-11 | TERMINAL BOARD 3P (ANTENNA)       |
| X301    | 1-567-250-11 | OSCILLATOR, CERAMIC               |
| X601    | 1-567-125-00 | VIBRATOR, CRYSTAL                 |

# INTEGRATED STEREO AMPLIFIER

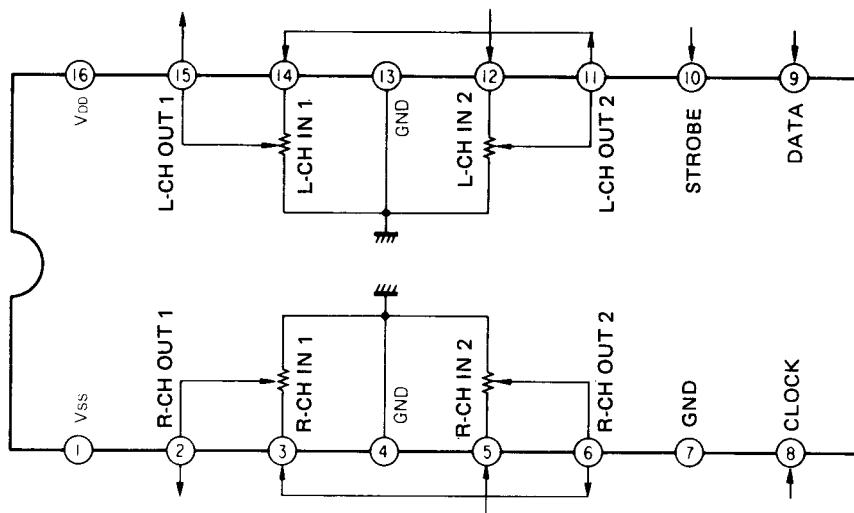
## [TA-177R]

Note: TA-177R is an integrated stereo amplifier unit in FH-150R.

### 1. IC'S OPERATION

#### 1-1. TC9176P (IC203)

TC9176P is an IC served as electronic volume.  
This IC is capable of controlling the attenuation  
from 0 dB to -76 dB at intervals of 2 dB.



#### ● Pin Functions

- (2) R-CH OUT 1, (15) L-CH OUT 1  
Output pin for 10 dB step attenuator.  
The signal applied to L/R-CH IN 1 attenuates 8  
steps from 0 to -70 dB at intervals of 10 dB.

- (3) R-CH IN 1, (14) L-CH IN 1  
Input pin for 10 dB step attenuator.

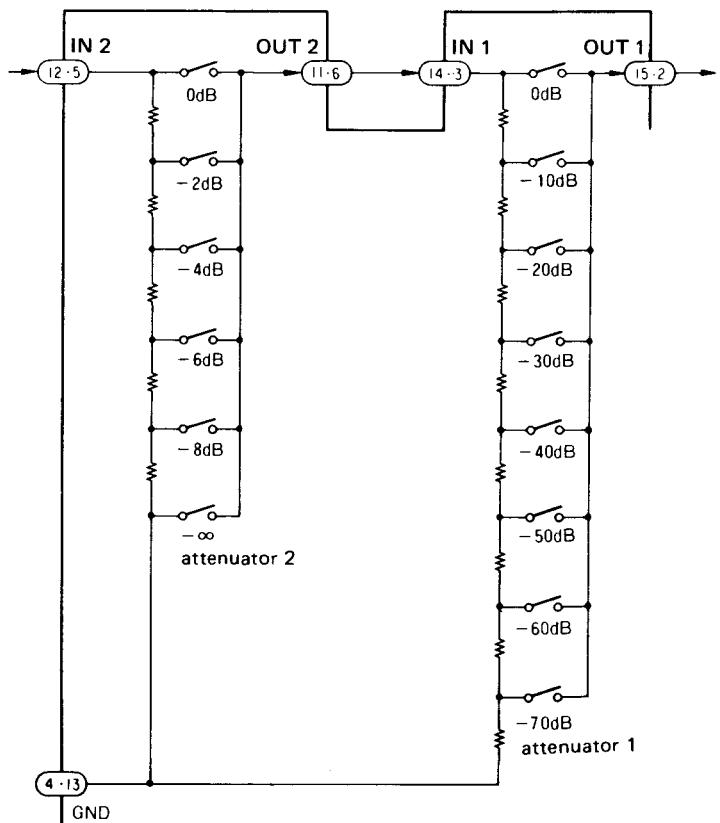
- (6) R-CH OUT 2, (11) L-CH OUT 2  
Output pin for 2 dB step attenuator.  
The signal applied to L/R-CH IN 2 attenuates 5  
steps from 0 to -8 dB at intervals of 2 dB.

- (5) R-CH IN 2, (12) L-CH IN 2  
Input pin for 2 dB step attenuator.

The attenuator is composed of the resistors and  
the analog switches.

Attenuator 1 attenuates 10 dB steps from 0 to  
-70 dB and attenuator 2 attenuates 2 dB steps  
from 0 to 8 dB.

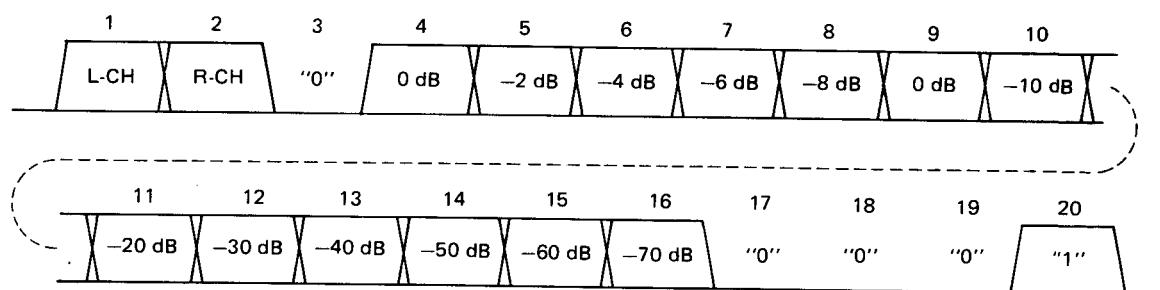
Total attenuation is 2 dB steps from 0 to -76 dB.



⑨ DATA

This pin is input the serial data from IC301.

Data contain attenuation value and selection of L-CH or R-CH, and these are composed of 20 bits.



⑧ CLOCK

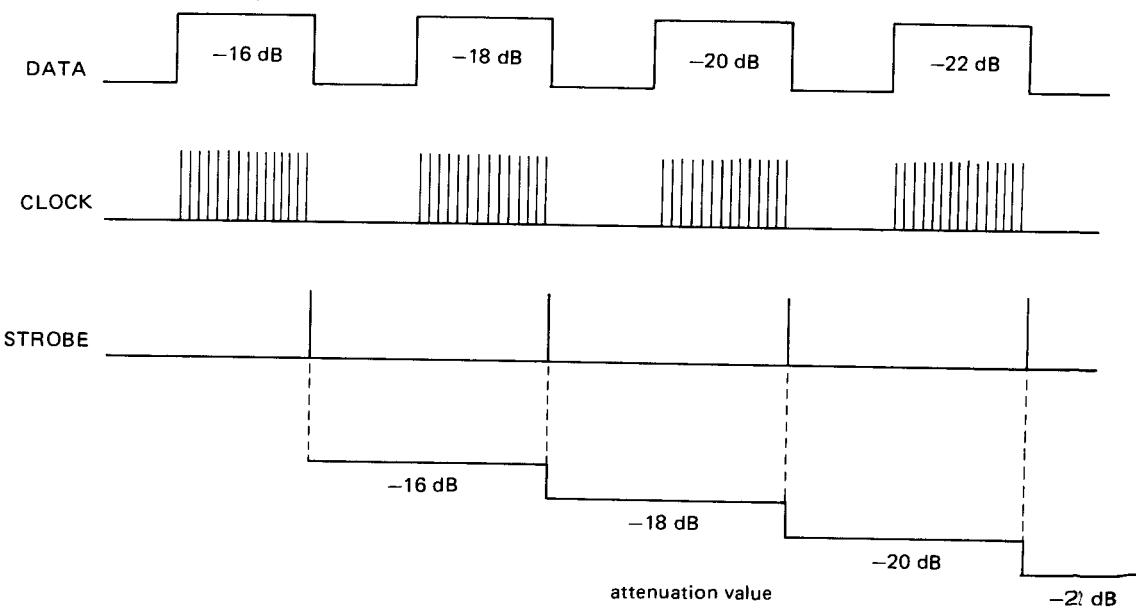
This pin is input the clock signal.

Data are input to the pin ⑨ that is synchronized by clock signal.

⑩ STROBE

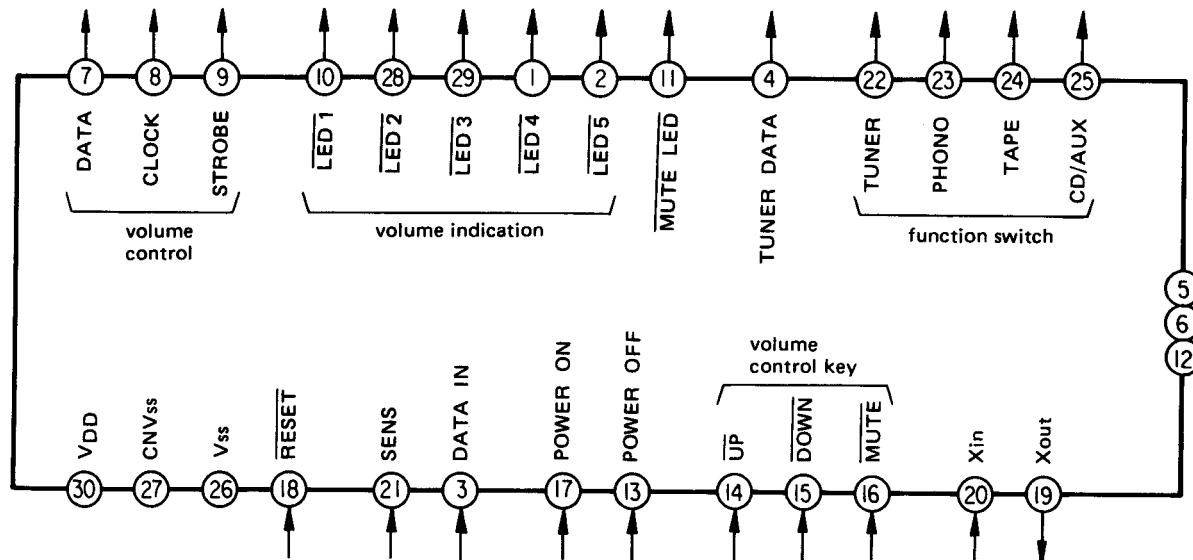
This pin is input the strobe pulse.

Data are latched, when strobe pulse is input to pin ⑩.



## 1-2. M50765-440SP (IC301)

M50765-440SP decodes the serial data of remote controller and feeds the volume control data to IC203.



### • Pin Functions

| Pin Number | Pin Name              | I/O            | Function   |
|------------|-----------------------|----------------|--|
| 3          | DATA IN               | Input          | This pin is input the serial data of remote controller.  |
| 21         | SENS                  | Input          | Input pin for starting transmission of the remote controller data. Input data (3) DATA is read at the beginning of the signal input to this pin.   |
| 17<br>13   | POWER ON<br>POWER OFF | Input<br>Input | When power is turned on, pin (17) is input high level pulse from differential circuit and IC will be in standby mode.<br>Second, pin (13) goes high level by integrating circuit and IC will be started. |
|            |                       |                | <p>After power is turned off, (13) pin goes low level by integrating circuit and IC detects power off.<br/>IC's data (volume data) are kept by back-up battery.</p>                                      |
| 14<br>15   | UP<br>DOWN            | Input<br>Input | Input pin for volume control.<br>When the signal is applied to these pins, (7) DATA, (8) CLOCK and (9) STROBE output the volume control data to IC203.   |
| 16         | MUTE                  | Input          | Input pin for switching MUTING -20 dB on/off.  |
| 22         | TUNER                 | Output         | Output pin for switching the mode to TUNER.<br>When (3) DATA IN inputs the data of TUNER, this pin goes high.  |

| Pin Number               | Pin Name                                  | I/O    | Function  |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
|--------------------------|---|--------|---|-------------------|-----|--|--|--|--|------|------|------|-----|-----|---------|---|---|---|---|---|----------|---|---|---|---|---|-----------|---|---|---|---|---|------------|---|---|---|---|---|------------|---|---|---|---|---|------------------|---|---|---|---|---|
| 23                       | PHONO                                     | Output | Output pin for switching the mode to PHONO.<br>When (3) DATA IN inputs the data of PHONO, this pin goes high.   |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 24                       | TAPE                                      | Output | Output pin for switching the mode to TAPE.<br>When (3) DATA IN inputs the data of TAPE, this goes high.   |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 25                       | CD/AUX                                    | Output | Output pin for switching the mode to CD/AUX.<br>When (3) DATA IN inputs the data of CD/AUX, this pin goes high.   |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 11                       | MUTE LED                                  | Output | Output pin for switching the MUTING -20 dB LED on/off.  |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 10<br>28<br>29<br>1<br>2 | LED 1<br>LED 2<br>LED 3<br>LED 4<br>LED 5 | Output | Output pin for indicating the volume level.<br>These pins output signal that cope with volume level.<br><table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Volume level (dB)</th> <th colspan="5">Pin</th> </tr> <tr> <th>(10)</th> <th>(28)</th> <th>(29)</th> <th>(1)</th> <th>(2)</th> </tr> </thead> <tbody> <tr> <td>0 to -2</td> <td>L</td> <td>L</td> <td>L</td> <td>L</td> <td>L</td> </tr> <tr> <td>-4 to -6</td> <td>L</td> <td>L</td> <td>L</td> <td>L</td> <td>H</td> </tr> <tr> <td>-8 to -18</td> <td>L</td> <td>L</td> <td>L</td> <td>H</td> <td>H</td> </tr> <tr> <td>-20 to -34</td> <td>L</td> <td>L</td> <td>H</td> <td>H</td> <td>H</td> </tr> <tr> <td>-36 to -76</td> <td>L</td> <td>H</td> <td>H</td> <td>H</td> <td>H</td> </tr> <tr> <td>-78 to <math>-\infty</math></td> <td>H</td> <td>H</td> <td>H</td> <td>H</td> <td>H</td> </tr> </tbody> </table> <span style="float: right;">H: high level<br/>L: low level</span> | Volume level (dB) | Pin |  |  |  |  | (10) | (28) | (29) | (1) | (2) | 0 to -2 | L | L | L | L | L | -4 to -6 | L | L | L | L | H | -8 to -18 | L | L | L | H | H | -20 to -34 | L | L | H | H | H | -36 to -76 | L | H | H | H | H | -78 to $-\infty$ | H | H | H | H | H |
| Volume level (dB)        | Pin                                       |        |   |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
|                          | (10)                                      | (28)   | (29)  | (1)               | (2) |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 0 to -2                  | L   | L      | L   | L                 | L   |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| -4 to -6                 | L   | L      | L   | L                 | H   |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| -8 to -18                | L   | L      | L   | H                 | H   |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| -20 to -34               | L   | L      | H   | H                 | H   |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| -36 to -76               | L   | H      | H   | H                 | H   |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| -78 to $-\infty$         | H   | H      | H   | H                 | H   |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 4                        | TUNER DATA                                | Output | This pin outputs the receiving band/station switching signal. That signal feeds to tuner unit (ST-177R).  |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 7                        | DATA                                      | Output | This pin outputs the volume control data to IC203.  |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 8                        | CLOCK                                     | Output | This pin outputs the clock signal of volume control data.   |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |
| 9                        | STROBE                                    | Output | This pin outputs the strobe signal of volume control data.  |                   |     |  |  |  |  |      |      |      |     |     |         |   |   |   |   |   |          |   |   |   |   |   |           |   |   |   |   |   |            |   |   |   |   |   |            |   |   |   |   |   |                  |   |   |   |   |   |

## 2. SERVICING NOTE (G-AEP model only)

- Caution on replacing screws fixing speaker terminal board.

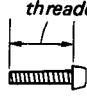
Two types (A), (B) of screw (BVTT3 x 20) is supplied as repair part for speaker terminal board fixing. If (A) type screw is supplied, make a hole as shown in the figure.

(A) type screw

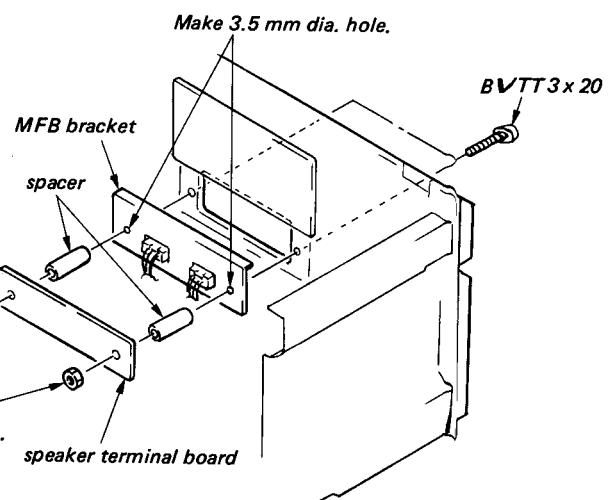


threaded length: 14 mm

(B) type screw



threaded length: 20 mm

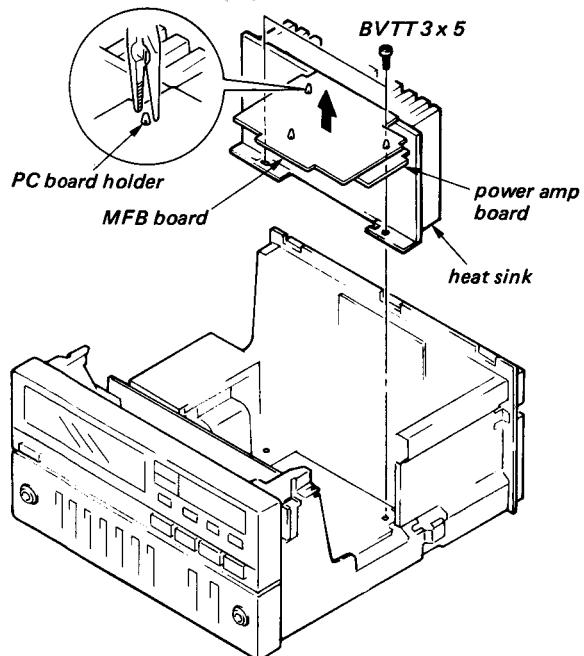


### 3. DISASSEMBLY

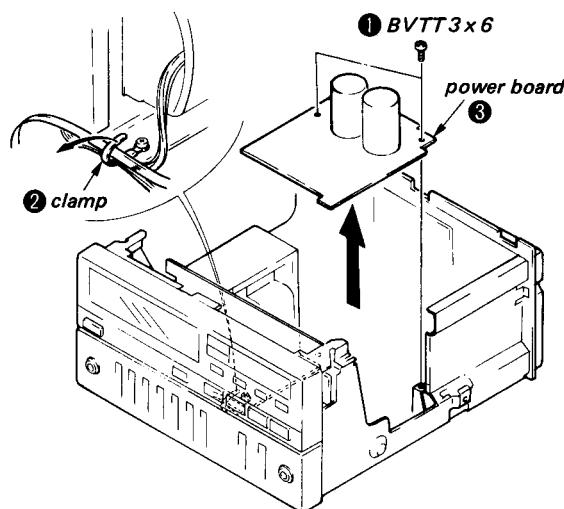
Note: Follow the disassembly procedure in the numerical order given.

#### MFB BOARD/POWER AMP BOARD

Unlock the MFB board from the PC board holder.

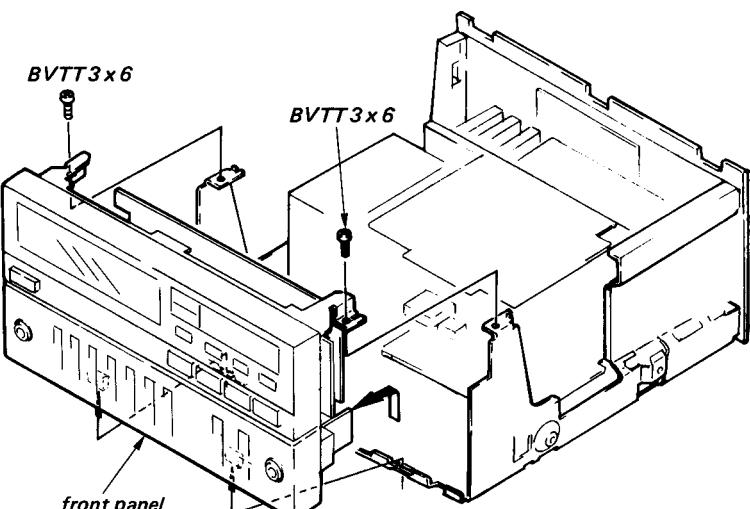


#### POWER BOARD

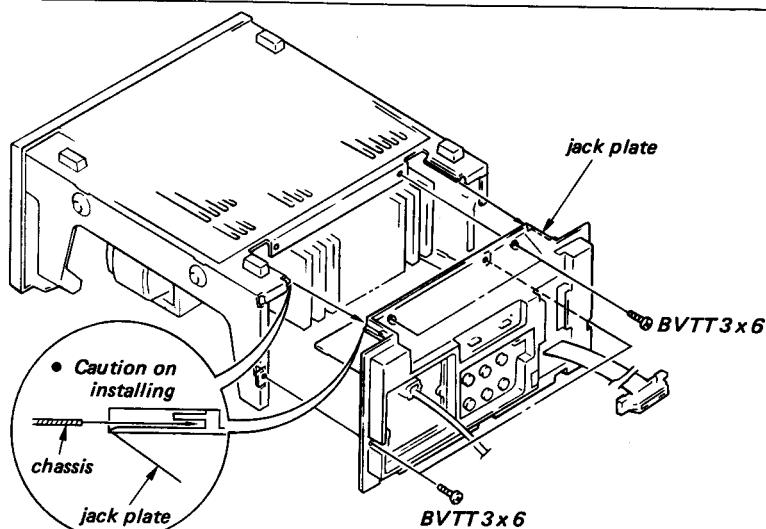


- Remove the case.  
(four screws)

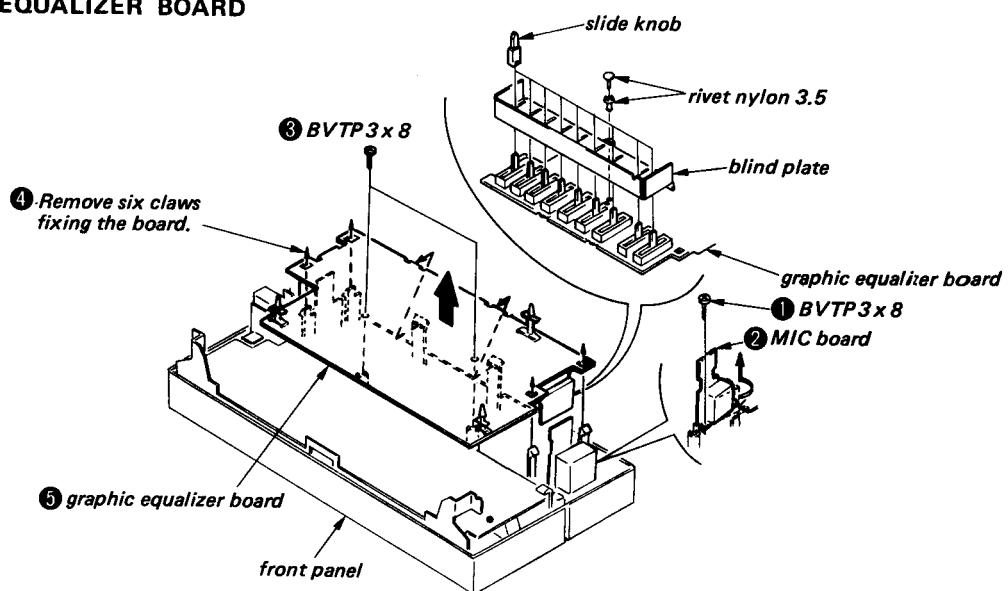
#### FRONT PANEL



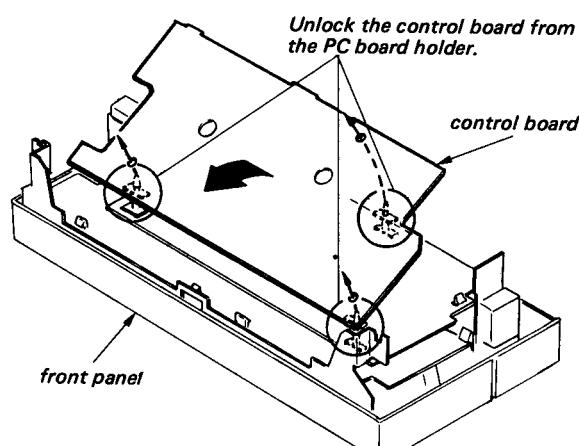
**JACK PLATE**



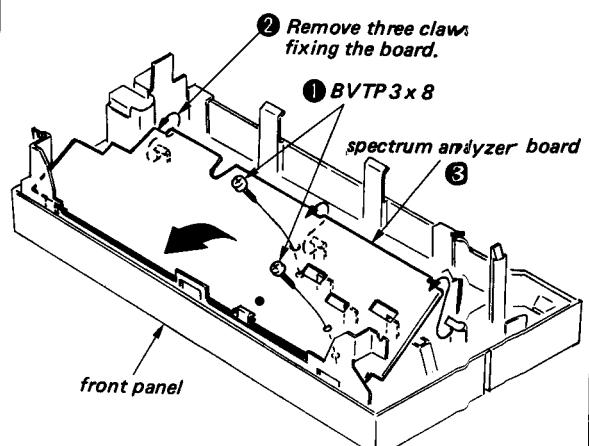
**GRAPHIC EQUALIZER BOARD**



**CONTROL BOARD**



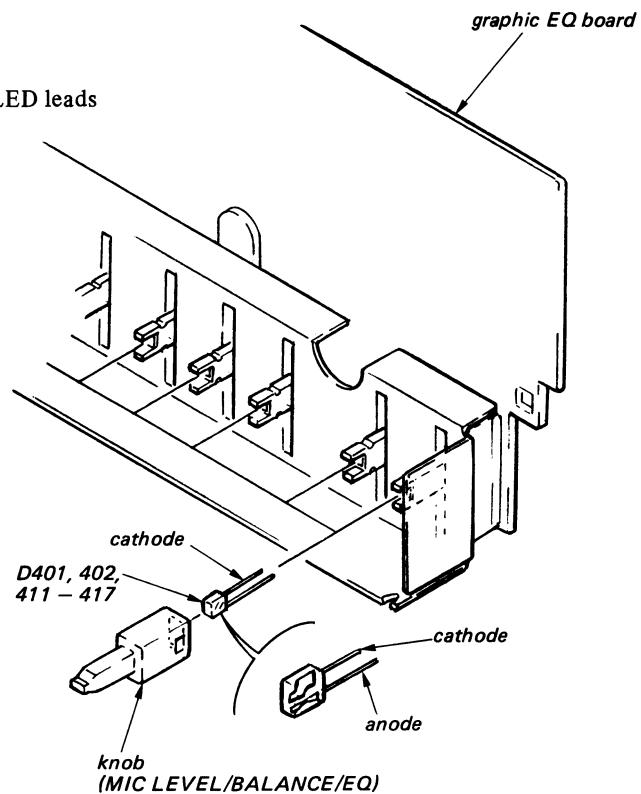
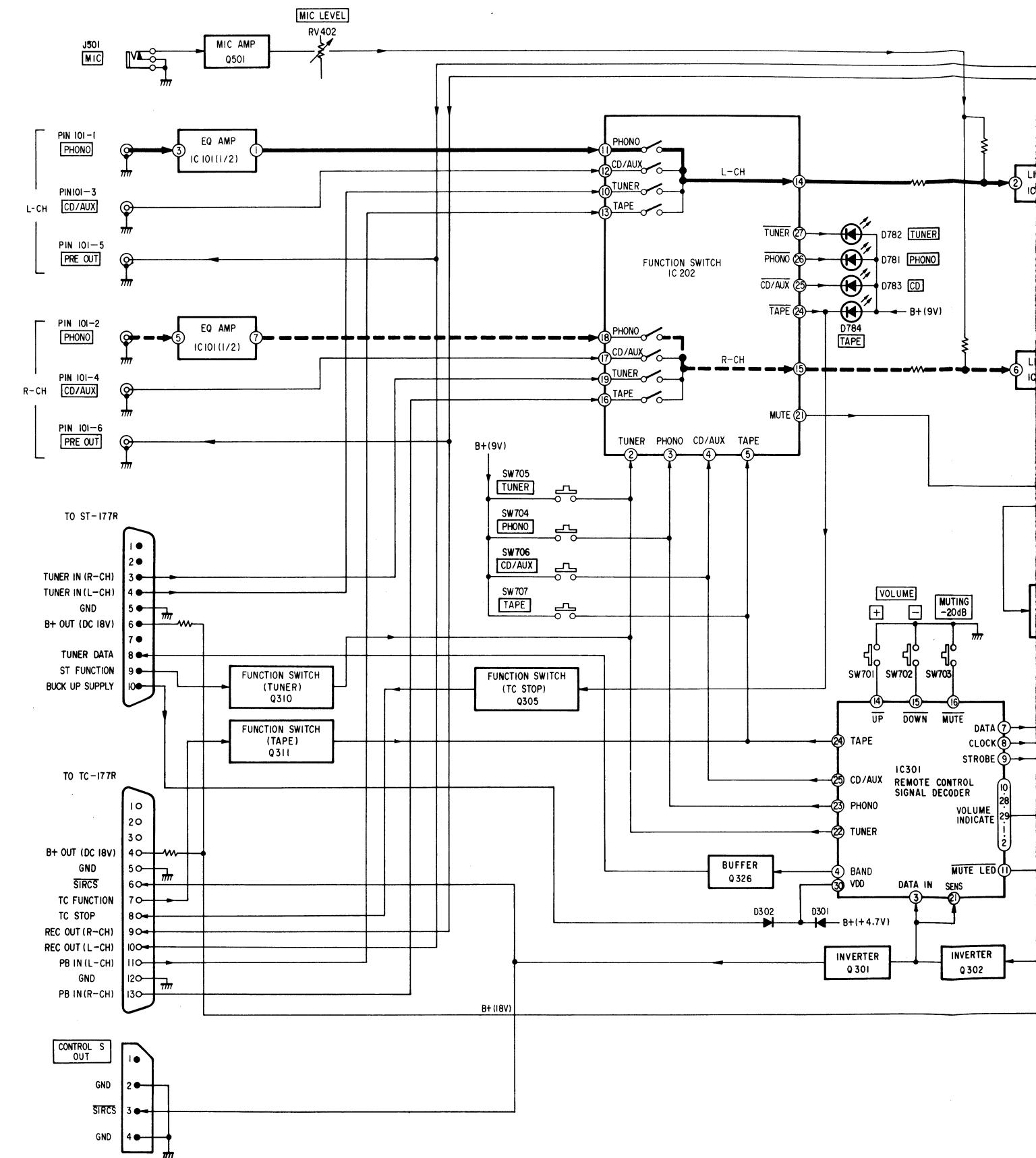
**SPECTRUM ANALYZER BOARD**

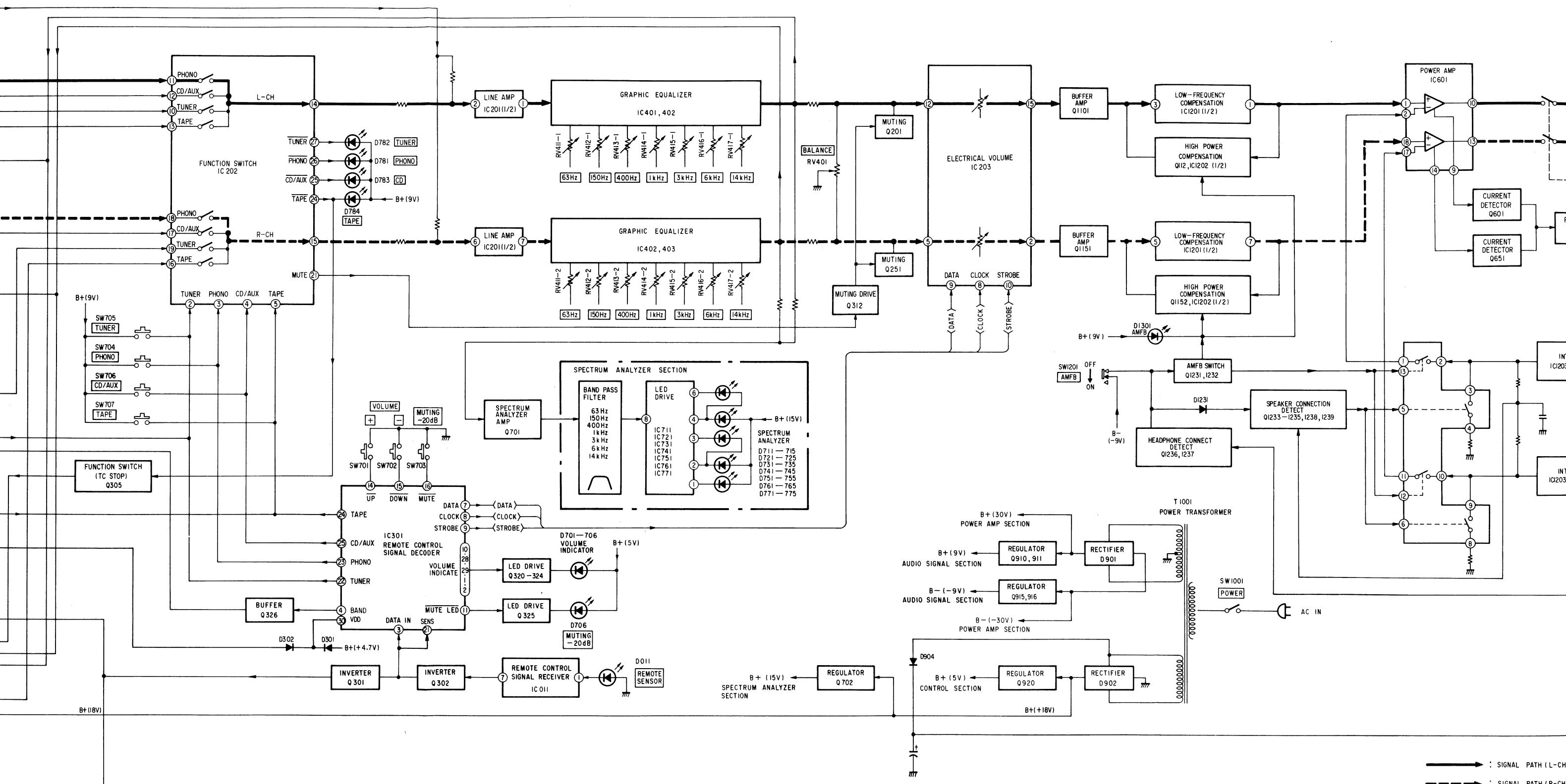


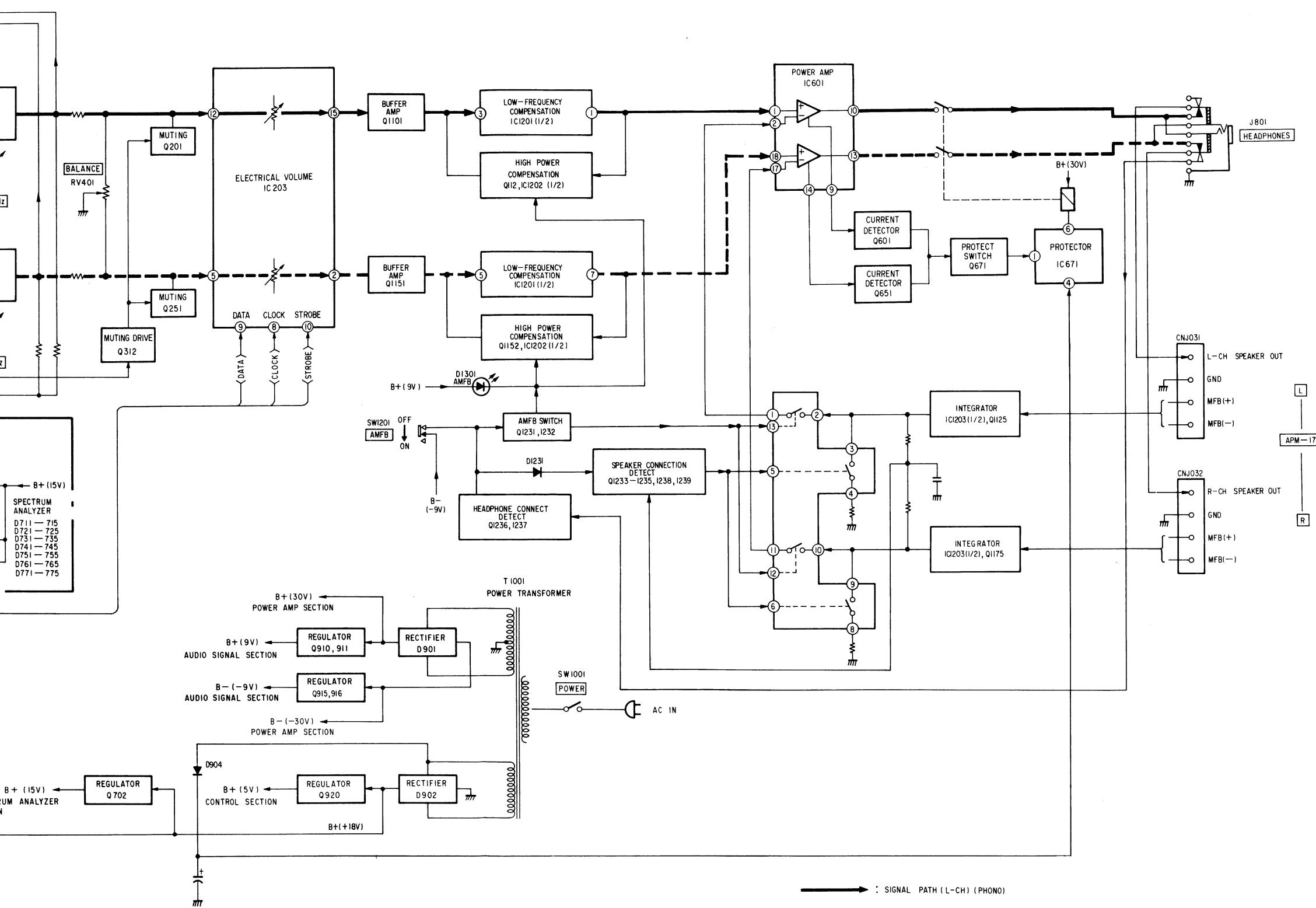
**LEDs OF D401, 402, 411 – 417 REPLACEMENT**

Though LEDs of D401, 402, 411 – 417 are built in each variable resistor RV401, 402, 411 – 417, only LEDs can be replaced.

1. Pull out the knobs, and pull out LED.
2. Cut the new LED leads as long as the LED leads mounted previously.

**4. BLOCK DIAGRAM**





● Semiconductor Lead Layouts

|  |  |  |
|--|--|--|
| <b>LC4966</b><br>1413121110 9 8<br>1 2 3 4 5 6 7<br>(Top view)                       | <b>HZ6A1L</b><br>HZ7A1L<br>HZ12A1<br>HZ16-2L<br>cathode<br>anode                 | <b>AA5535S</b><br>long short<br>anode cathode  |
| <b>M5226P</b><br><b>TC9176P</b><br>16151413121110 9<br>1 2 3 4 5 6 7 8<br>(Top view) | <b>2SC1841-PA</b>  |  |
| <b>PH302B</b>  |  |  |
| <b>LC7816H</b><br>28<br>1 2 3 4 5 6 7 8 15<br>(Top view)                             | <b>2SC634SP</b><br><b>2SC260F</b><br><b>DTA144WS</b><br><b>DTC144WS</b>          |  |
| <b>RB402</b><br><b>Marking</b>   | <b>RB402</b><br>30<br>1 2 3 4 5 6 7 8 16<br>(Top view)                           | <b>2SK381-E</b><br>S G D                       |
| <b>M50765-440SP</b><br>30<br>1 2 3 4 5 6 7 8 15<br>(Top view)                        |  | <b>2SD809</b><br>letter side                   |
| <b>RB602F</b>  |  |  |
| <b>CX20106A</b><br><b>M5218L</b><br><b>μPC1237H</b>                                  | <b>IR2E31</b><br>1 2 3 4 5 6 7 8 9   | <b>LN450YP</b><br>anode cathode                |
| <b>STK4152II</b>   |  |  |
| <b>SEL2710K</b><br>long short<br>anode cathode                                       |  | <b>2SB965-Q</b>                                |
| <b>1SS119</b><br>cathode<br>anode  | <b>SEL2210S-C</b><br><b>SEL2410E-C</b><br><b>SEL2810A-C</b><br><b>SEL2910A-C</b> | <b>2SD1288-Q</b><br>MARKING SIDE VIEW<br>B C E |
| <b>2SA1175</b><br>letter side<br>anode cathode                                       |  |  |

## 5. MOUNTING DIAGRAM

### ● Semiconductor Location

| Ref. No. | Location | Ref. No. | Location | Ref. No. | Location | Ref. No. | Location |
|----------|----------|----------|----------|----------|----------|----------|----------|
| IC011    | J-4      | Q325     | H-13     | D321     | G-10     | D745     | H-8      |
| IC101    | D-17     | Q326     | H-12     | D401     | D-2      | D751     | G-7      |
| IC201    | H-11     | Q501     | B-3      | D402     | C-2      | D752     | G-7      |
| IC202    | G-10     | Q601     | C-22     | D411     | I-3      | D753     | G-7      |
| IC203    | I-11     | Q651     | D-21     | D412     | H-3      | D754     | G-7      |
| IC301    | I-13     | Q671     | D-22     | D413     | G-3      | D755     | G-8      |
| IC401    | G-4      | Q701     | I-6      | D414     | G-2      | D761     | G-6      |
| IC402    | F-4      | Q702     | E-6      | D415     | F-3      | D762     | G-7      |
| IC403    | E-4      | Q910     | I-24     | D416     | E-2      | D763     | G-7      |
| IC601    | B-22     | Q911     | I-23     | D417     | E-3      | D764     | G-7      |
| IC671    | C-23     | Q915     | H-22     | D671     | C-23     | D765     | G-8      |
| IC711    | I-8      | Q916     | H-22     | D701     | F-7      | D771     | F-7      |
| IC721    | H-8      | Q920     | H-21     | D702     | F-7      | D772     | F-7      |
| IC731    | H-8      | Q1101    | H-19     | D703     | F-7      | D773     | F-7      |
| IC741    | G-8      | Q1102    | I-18     | D704     | F-7      | D774     | F-7      |
| IC751    | G-8      | Q1125    | G-16     | D705     | E-8      | D775     | F-8      |
| IC761    | F-8      | Q1151    | H-20     | D706     | E-8      | D781     | C-6      |
| IC771    | F-8      | Q1152    | G-19     | D711     | I-7      | D782     | D-6      |
| IC1201   | G-18     | Q1175    | E-16     | D712     | I-7      | D783     | D-6      |
| IC1202   | F-18     | Q1231    | I-16     | D713     | I-7      | D784     | E-6      |
| IC1203   | F-18     | Q1232    | I-17     | D714     | I-7      | D791     | E-6      |
| IC1204   | G-15     | Q1233    | H-16     | D715     | I-8      | D901     | J-22     |
| Q201     | H-11     | Q1235    | I-16     | D722     | I-7      | D904     | I-21     |
| Q251     | I-12     | Q1236    | I-15     | D723     | I-7      | D910     | J-23     |
| Q301     | E-13     | Q1237    | H-15     | D724     | I-7      | D915     | I-22     |
| Q302     | J-12     | Q1238    | I-16     | D725     | I-8      | D920     | H-21     |
| Q305     | F-12     | Q1239    | I-16     | D731     | H-7      | D1101    | I-18     |
| Q310     | D-13     |          |          | D732     | H-7      | D1102    | I-17     |
| Q311     | D-13     | D011     | J-5      | D733     | H-7      | D1125    | F-18     |
| Q312     | G-10     | D301     | E-12     | D734     | H-7      | D1151    | G-19     |
| Q320     | H-13     | D302     | D-13     | D735     | H-8      | D1152    | G-19     |
| Q321     | H-13     | D303     | J-13     | D741     | H-7      | D1175    | F-18     |
| Q322     | H-13     | D304     | F-10     | D742     | H-7      | D1231    | I-15     |
| Q323     | G-12     | D311     | F-13     | D743     | H-7      | D1232    | I-15     |
| Q324     | H-12     | D312     | H-10     | D744     | H-7      | D1301    | J-15     |

Note:  
EA3: Saudi Arabia model  
AED: DENMARK model

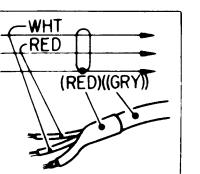
### Note: SCHEMATIC DIAGRAM

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\mu\text{F}$  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4\text{W}$  or less unless otherwise specified.
- : signal path.
- Components for right channel have same values as for left channel. Reference numbers are coded from 150, 250, 450, 650, 1150.
- : nonflammable resistor.
- : fusible resistor.
- : B+ bus.
- - - : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50  $\text{k}\Omega/\text{V}$ ).  
no mark: Not connecting speaker.
- < > : When inserting headphone plug into HEAD-PHONES JACK.
- ( ) : When AMFB switch is off connecting APM-177M speaker or a load resistor (1k – 1.5k) with speaker terminal.
- (( )) : When AMFB switch is ON connecting APM-177M speaker or a load resistor (1k – 1.5k) with speaker terminal.
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in no-signal mode by using oscilloscope.  
Voltage variations may be noted due to normal production tolerances.
- Switches

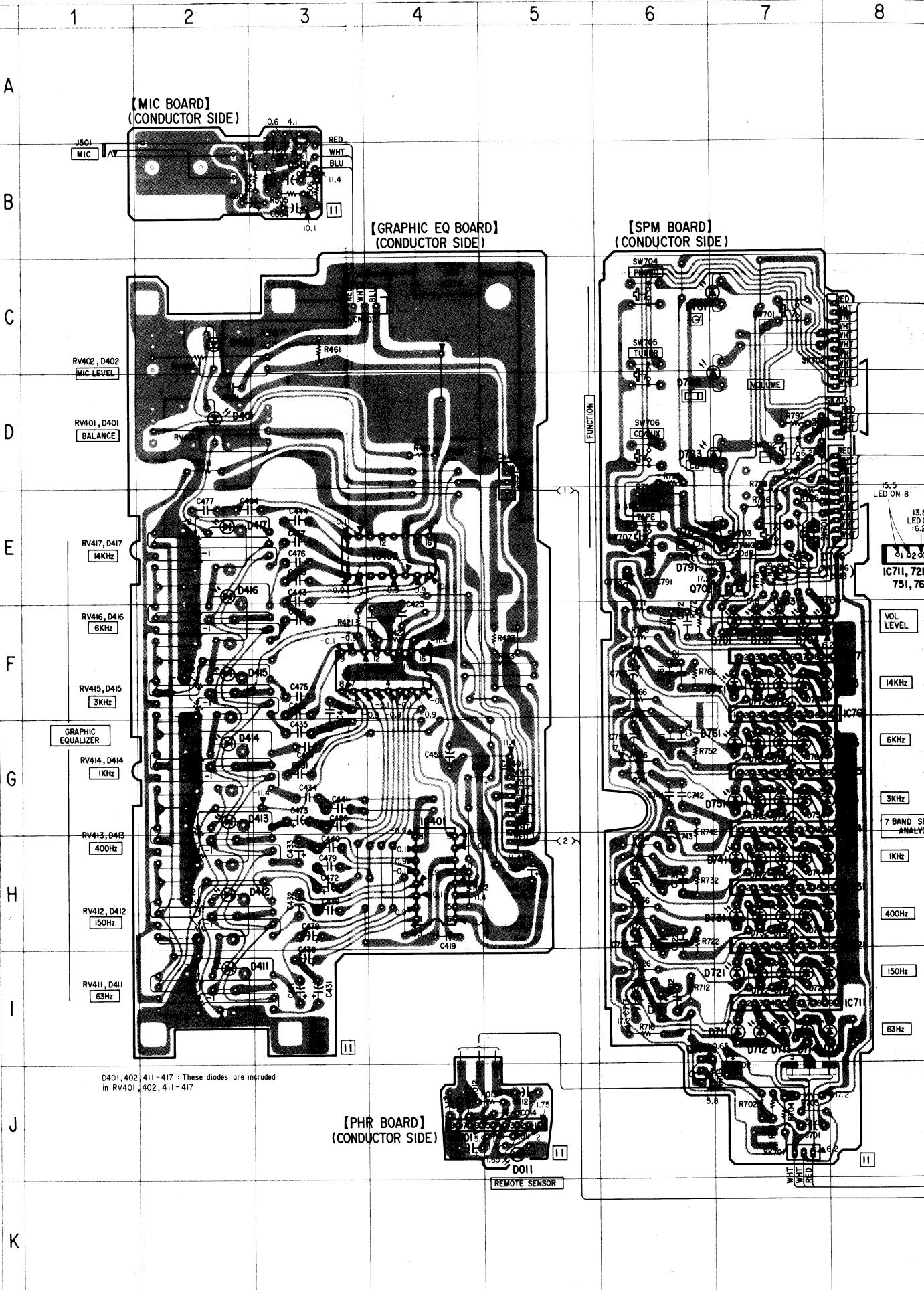
| Ref. No. | Switch                                  | Position |
|----------|---|----------|
| SW701    | VOLUME UP                               | OFF      |
| SW702    | VOLUME DOWN                             | OFF      |
| SW703    | MUTING -20 dB                           | OFF      |
| SW704    | PHONO                                   | OFF      |
| SW705    | TUNER                                   | OFF      |
| SW706    | CD/AUX                                  | OFF      |
| SW707    | TAPE                                    | OFF      |
| SW1001   | POWER                                   | OFF      |
| SW1002   | VOLTAGE SELECTOR<br>(E, EA3 model only) | 240 V    |
| SW1201   | AMFB                                    | OFF      |

### Note: MOUNTING DIAGRAM

- Color code of sleeving over the end of the jacket.



- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.



## 5. MOUNTING DIAGRAM

### ● Semiconductor Location

| Ref. No. | Location | Ref. No. | Location | Ref. No. | Location | Ref. No. | Location |
|----------|----------|----------|----------|----------|----------|----------|----------|
| IC011    | J-4      | Q325     | H-13     | D321     | G-10     | D745     | H-8      |
| IC101    | D-17     | Q326     | H-12     | D401     | D-2      | D751     | G-7      |
| IC201    | H-11     | Q501     | B-3      | D402     | C-2      | D752     | G-7      |
| IC202    | G-10     | Q601     | C-22     | D411     | I-3      | D753     | G-7      |
| IC203    | I-11     | Q651     | D-21     | D412     | H-3      | D754     | G-7      |
| IC301    | I-13     | Q671     | D-22     | D413     | G-3      | D755     | G-8      |
| IC401    | G-4      | Q701     | I-6      | D414     | G-2      | D761     | G-6      |
| IC402    | F-4      | Q702     | E-6      | D415     | F-3      | D762     | G-7      |
| IC403    | E-4      | Q910     | I-24     | D416     | E-2      | D763     | G-7      |
| IC601    | B-22     | Q911     | I-23     | D417     | E-3      | D764     | G-7      |
| IC671    | C-23     | Q915     | H-22     | D671     | C-23     | D765     | G-8      |
| IC711    | I-8      | Q916     | H-22     | D701     | F-7      | D771     | F-7      |
| IC721    | H-8      | Q920     | H-21     | D702     | F-7      | D772     | F-7      |
| IC731    | H-8      | Q1101    | H-19     | D703     | F-7      | D773     | F-7      |
| IC741    | G-8      | Q1102    | I-18     | D704     | F-7      | D774     | F-7      |
| IC751    | G-8      | Q1125    | G-16     | D705     | E-8      | D775     | F-8      |
| IC761    | F-8      | Q1151    | H-20     | D706     | E-8      | D781     | C-6      |
| IC771    | F-8      | Q1152    | G-19     | D711     | I-7      | D782     | D-6      |
| IC1201   | G-18     | Q1175    | E-16     | D712     | I-7      | D783     | D-6      |
| IC1202   | F-18     | Q1231    | I-16     | D713     | I-7      | D784     | E-6      |
| IC1203   | F-18     | Q1232    | I-17     | D714     | I-7      | D791     | E-6      |
| IC1204   | G-15     | Q1233    | H-16     | D715     | I-8      | D901     | J-22     |
| Q201     | H-11     | Q1235    | I-16     | D722     | I-7      | D904     | I-21     |
| Q251     | I-12     | Q1236    | I-15     | D723     | I-7      | D910     | J-23     |
| Q301     | E-13     | Q1237    | H-15     | D724     | I-7      | D915     | I-22     |
| Q302     | J-12     | Q1238    | I-16     | D725     | I-8      | D920     | H-21     |
| Q305     | F-12     | Q1239    | I-16     | D731     | H-7      | D1101    | I-18     |
| Q310     | D-13     |          |          | D732     | H-7      | D1102    | I-17     |
| Q311     | D-13     | D011     | J-5      | D733     | H-7      | D1125    | F-18     |
| Q312     | G-10     | D301     | E-12     | D734     | H-7      | D1151    | G-19     |
| Q320     | H-13     | D302     | D-13     | D735     | H-8      | D1152    | G-19     |
| Q321     | H-13     | D303     | J-13     | D741     | H-7      | D1175    | F-18     |
| Q322     | H-13     | D304     | F-10     | D742     | H-7      | D1231    | I-15     |
| Q323     | G-12     | D311     | F-13     | D743     | H-7      | D1232    | I-15     |
| Q324     | H-12     | D312     | H-10     | D744     | H-7      | D1301    | J-15     |

Note:  
EA3: Saudi Arabia model  
AED: DENMARK model

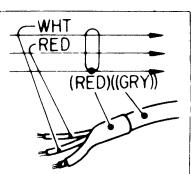
### Note: SCHEMATIC DIAGRAM

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\mu\text{F}$ :  $\mu\mu\text{F}$  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4\text{W}$  or less unless otherwise specified.
- : signal path.
- Components for right channel have same values as for left channel. Reference numbers are coded from 150, 250, 450, 650, 1150.
- : nonflammable resistor.
- : fusible resistor.
- : B+ bus.
- - - : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50  $\text{k}\Omega/\text{V}$ ).  
no mark: Not connecting speaker.  
< > : When inserting headphone plug into HEAD-PHONES JACK.
- ( ) : When AMFB switch is off connecting APM-177M speaker or a load resistor (1k – 1.5k) with speaker terminal.  
(( )) : When AMFB switch is ON connecting APM-177M speaker or a load resistor (1k – 1.5k) with speaker terminal.
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken to ground in no-signal mode by using oscilloscope.  
Voltage variations may be noted due to normal production tolerances.
- Switches

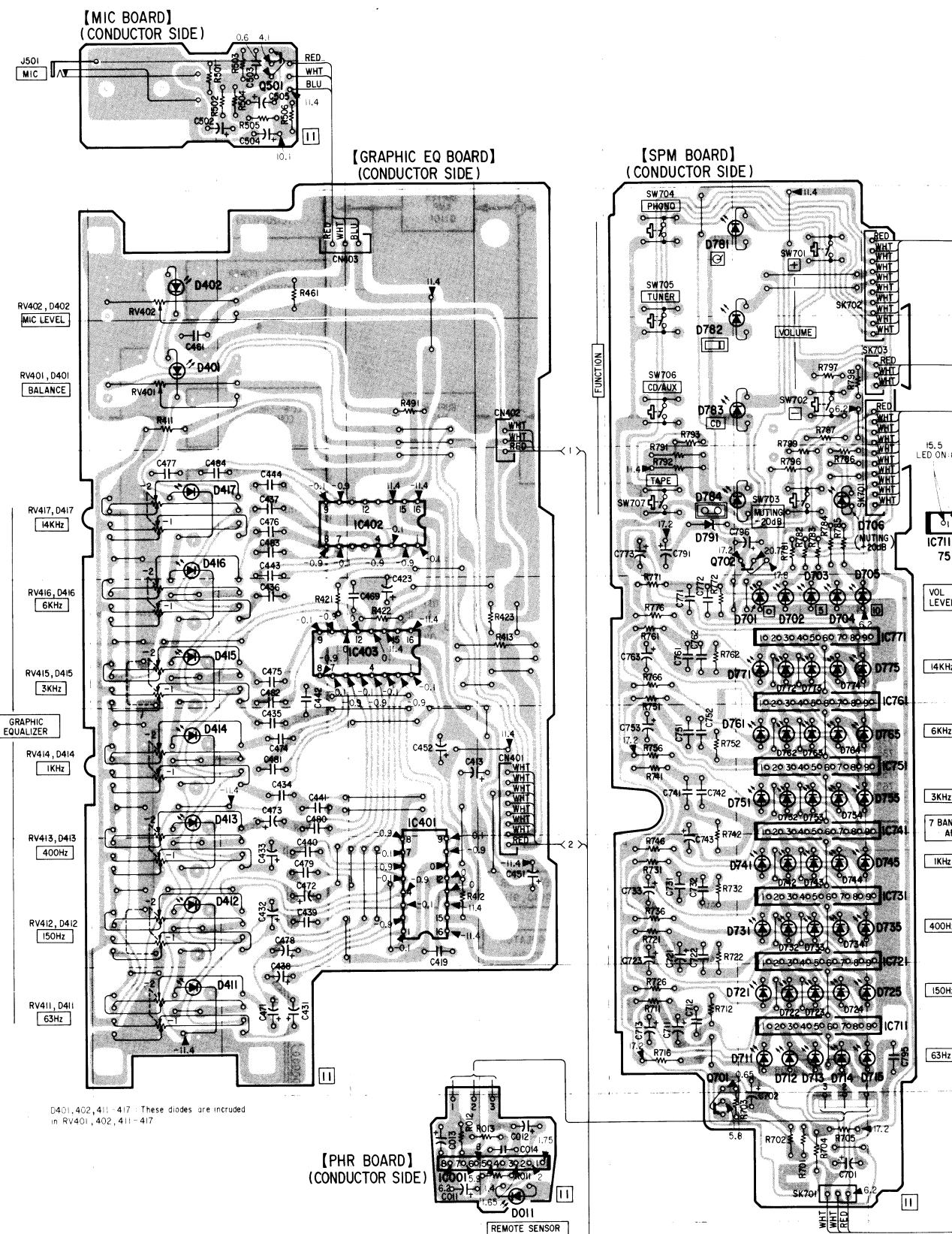
| Ref. No. | Switch                                  | Position |
|----------|---|----------|
| SW701    | VOLUME UP                               | OFF      |
| SW702    | VOLUME DOWN                             | OFF      |
| SW703    | MUTING -20 dB                           | OFF      |
| SW704    | PHONO                                   | OFF      |
| SW705    | TUNER                                   | OFF      |
| SW706    | CD/AUX                                  | OFF      |
| SW707    | TAPE                                    | OFF      |
| SW1001   | POWER                                   | OFF      |
| SW1002   | VOLTAGE SELECTOR<br>(E, EA3 model only) | 240 V    |
| SW1201   | AMFB                                    | OFF      |

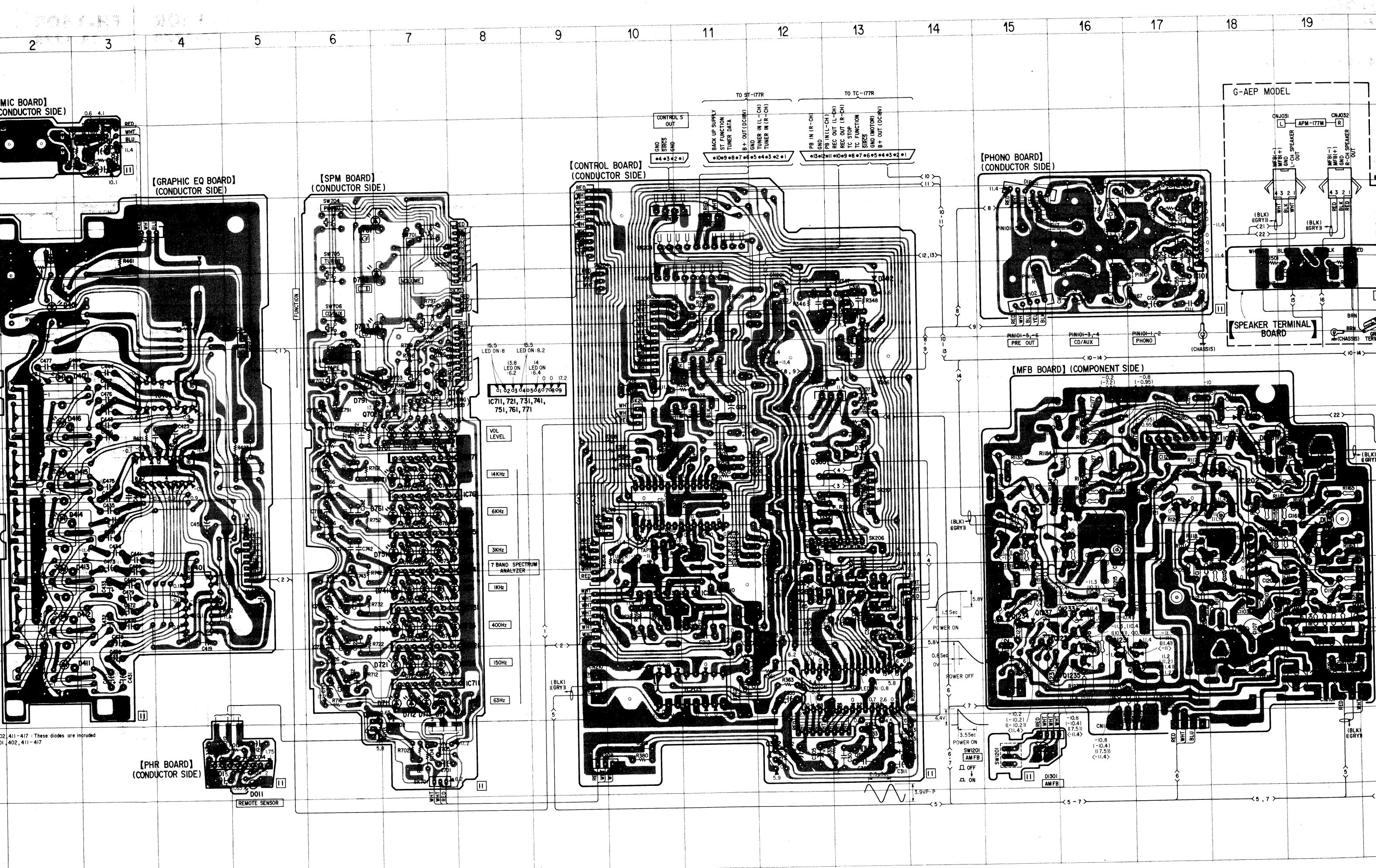
### Note: MOUNTING DIAGRAM

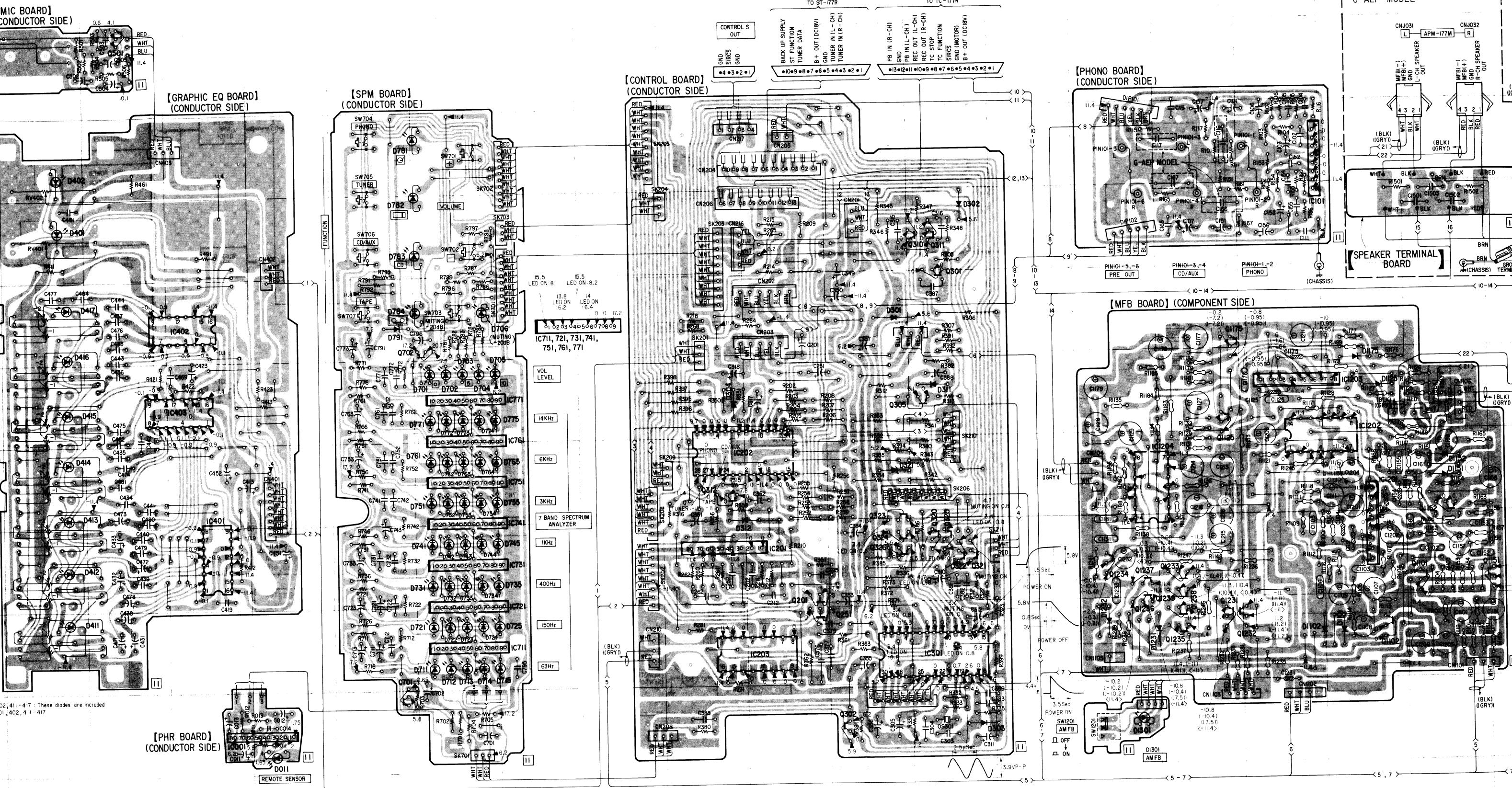
- Color code of sleeving over the end of the jacket.

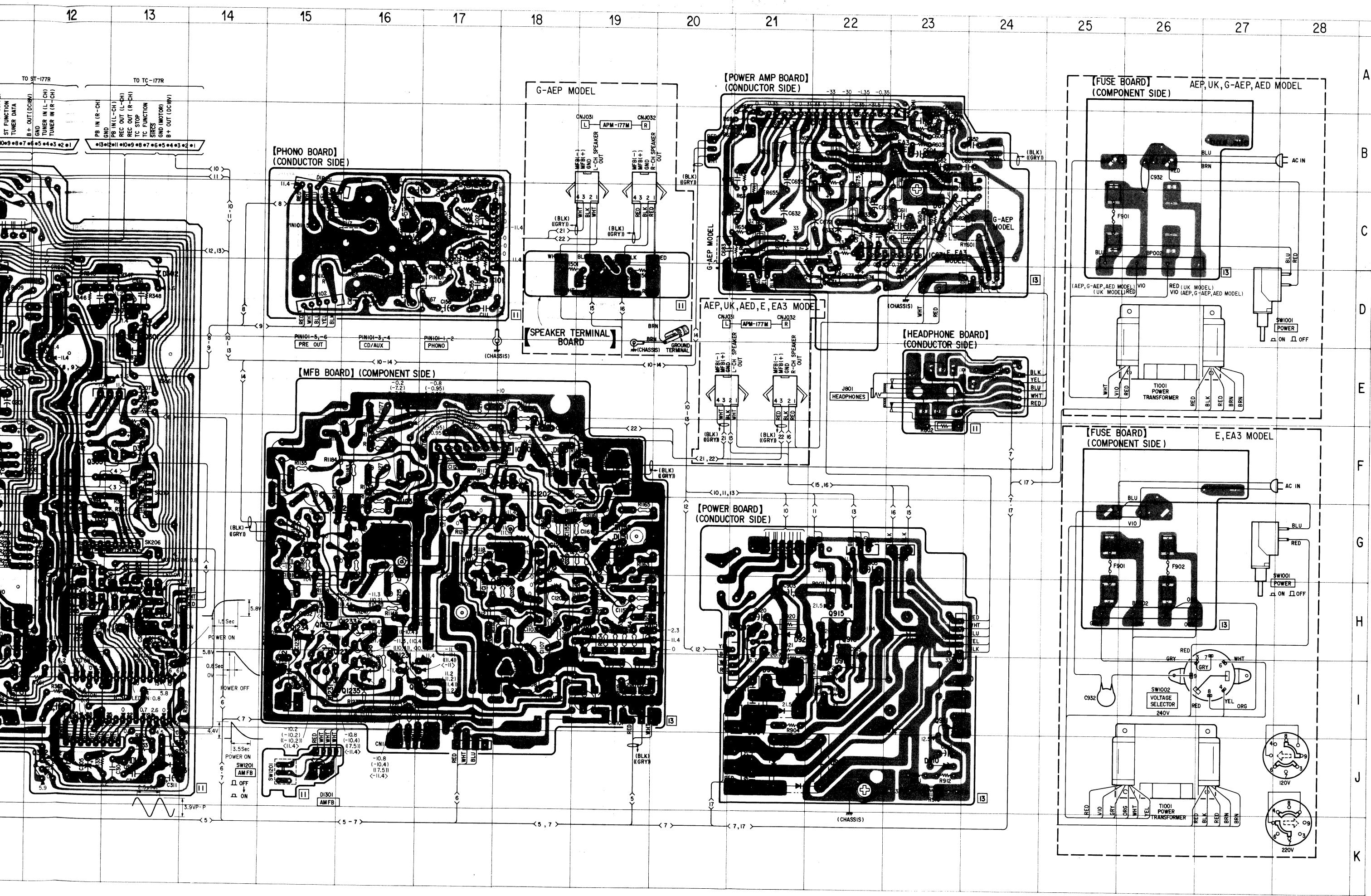


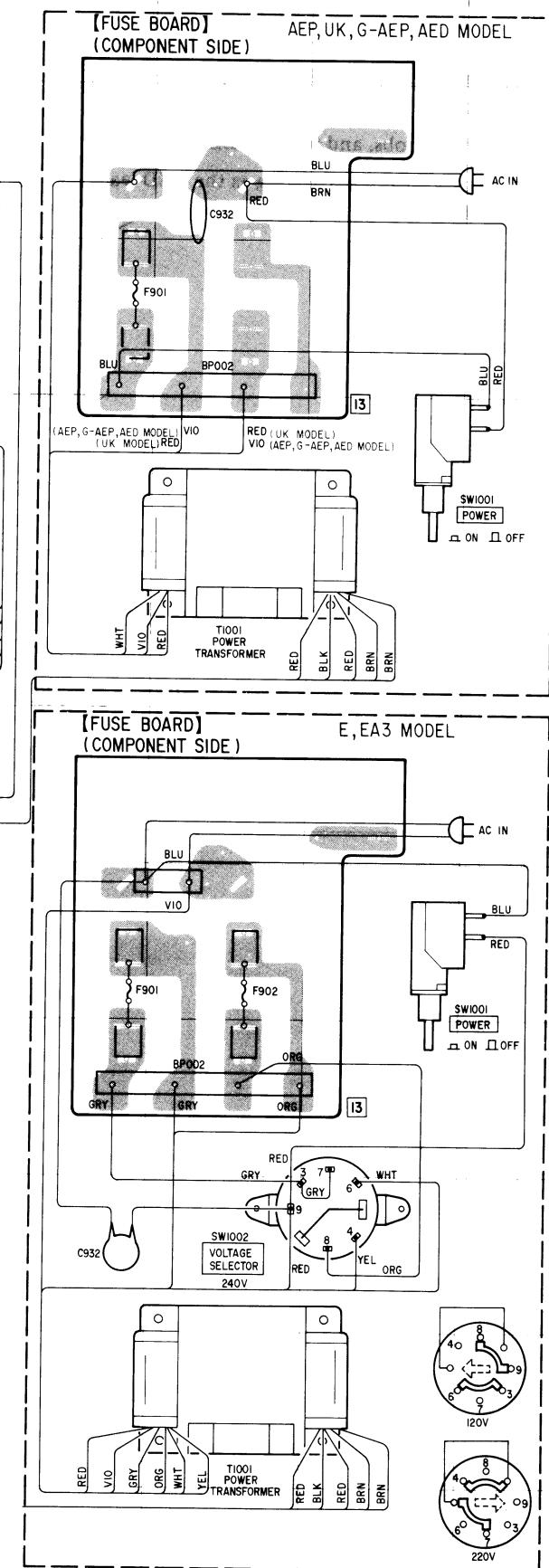
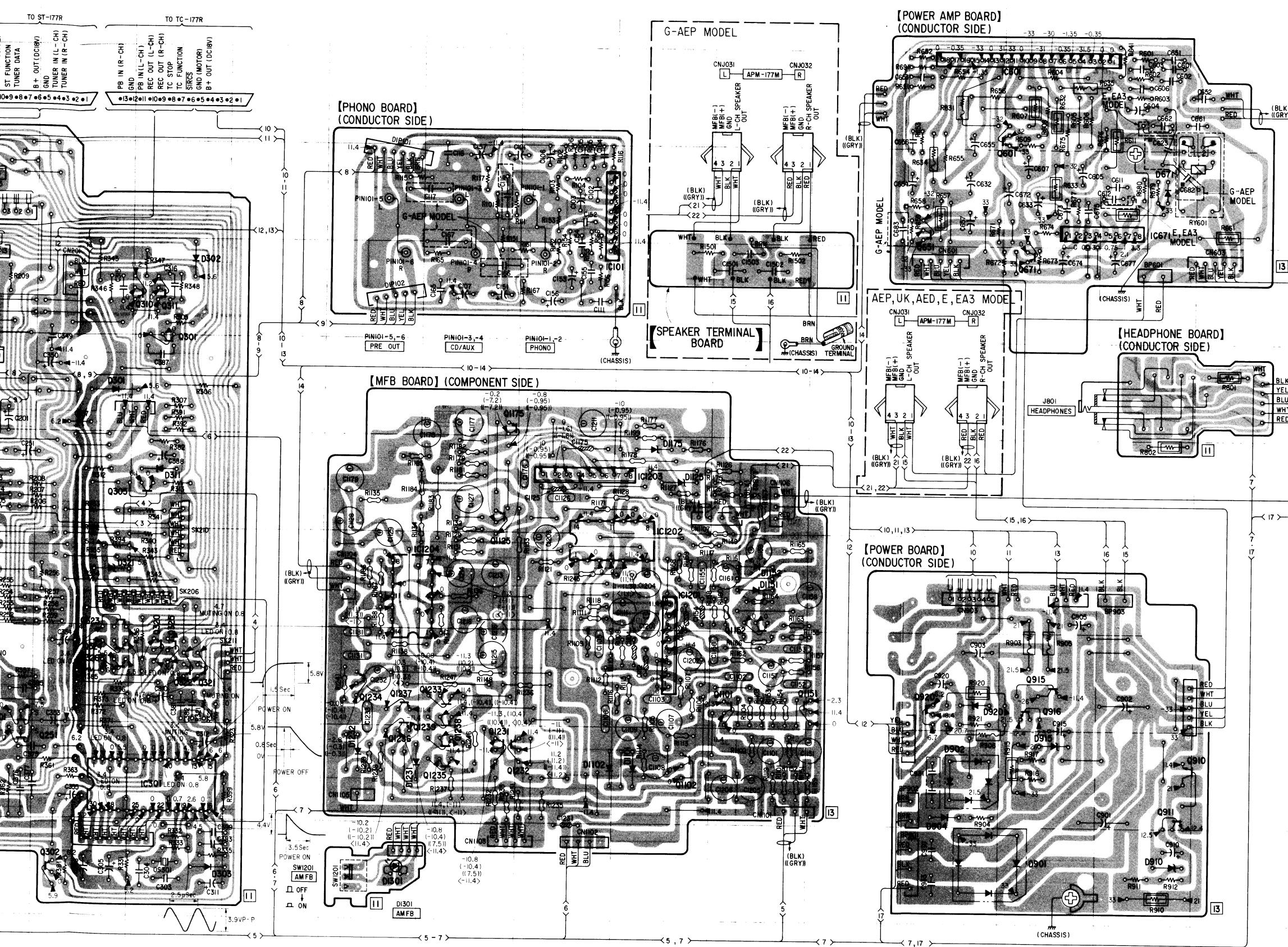
- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.









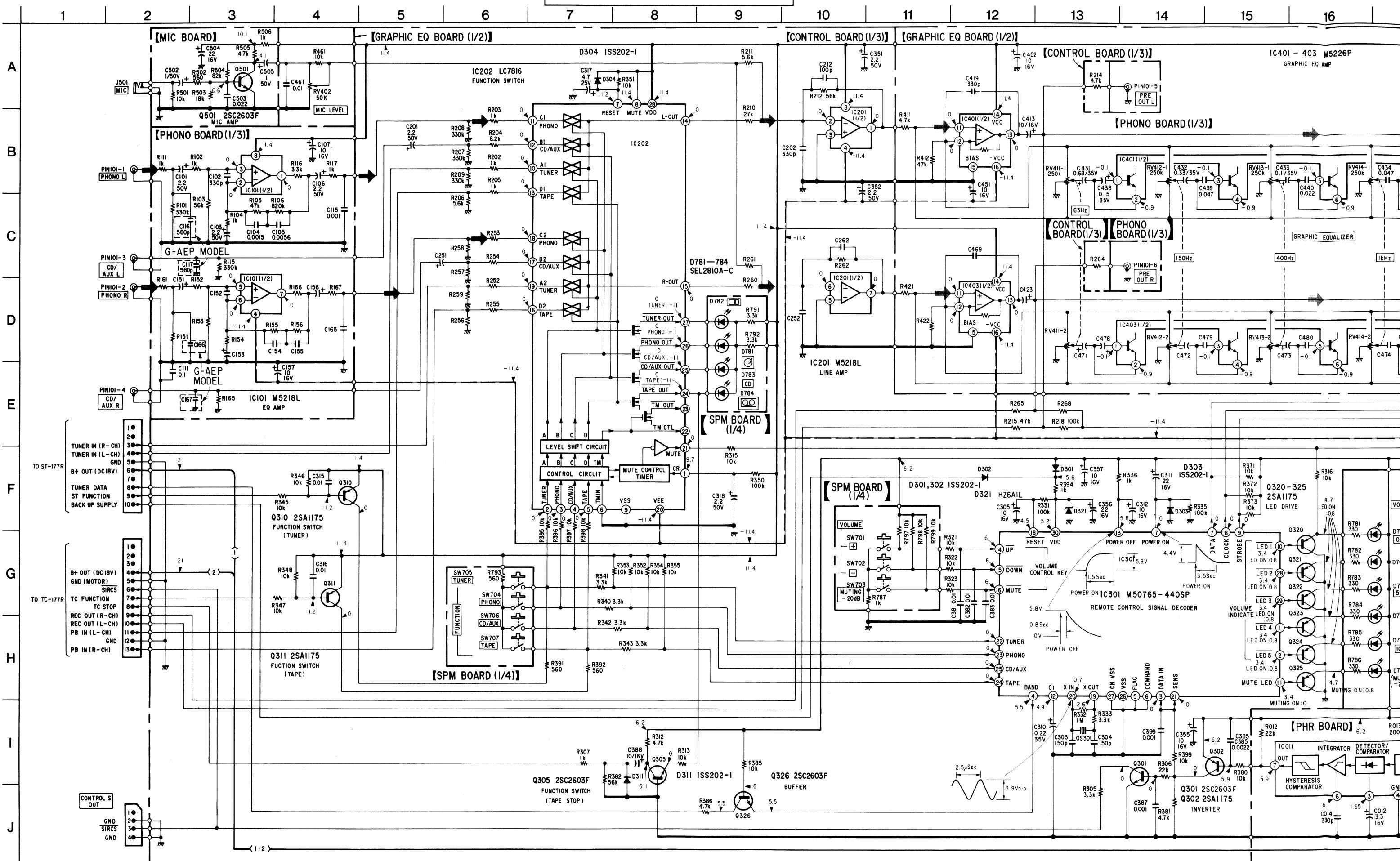


## **6. SCHEMATIC DIAGRAM**

- See page TA-13 for notes.

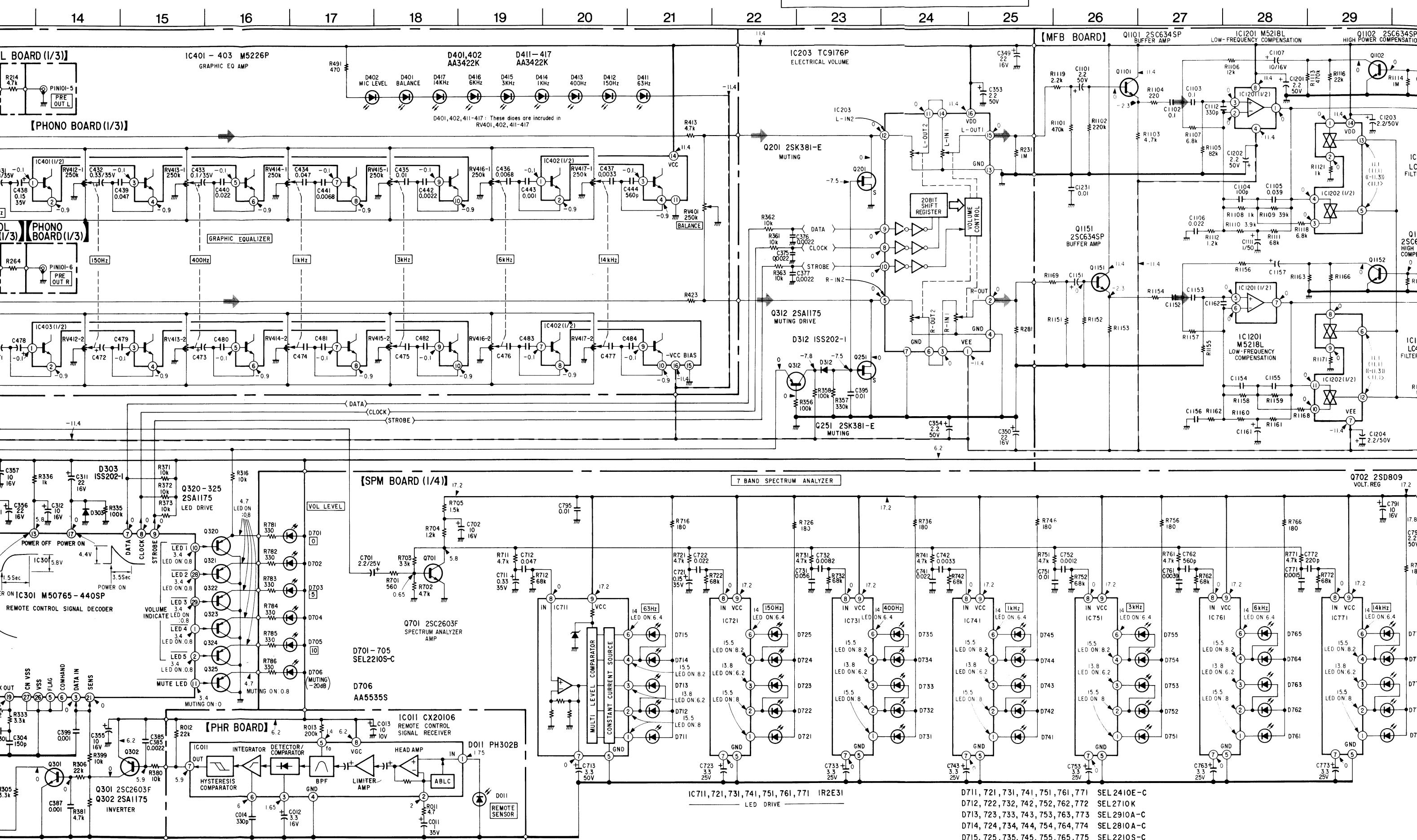
**FH-150R  
TA-177R**

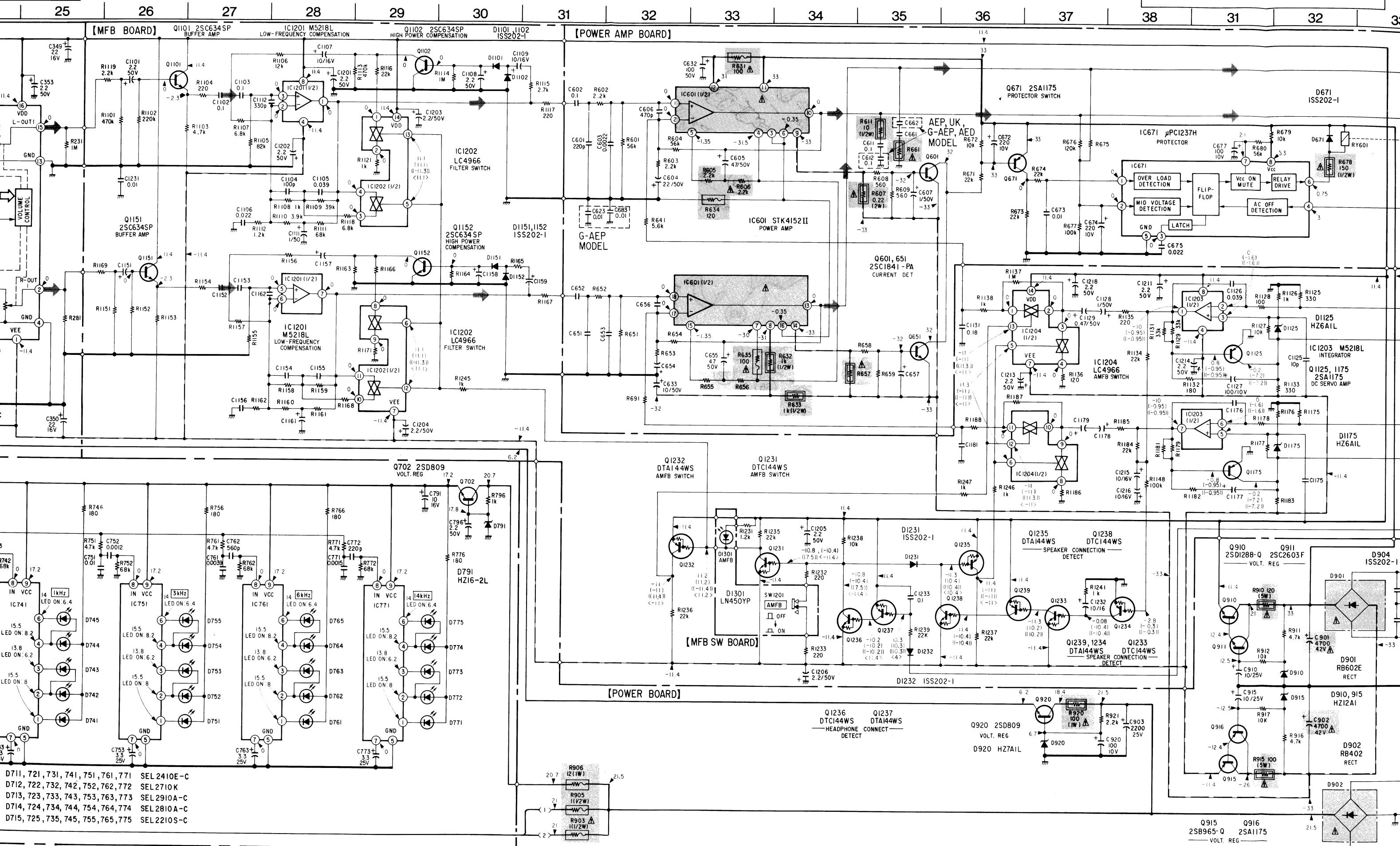
**FH-150R  
TA-177R**

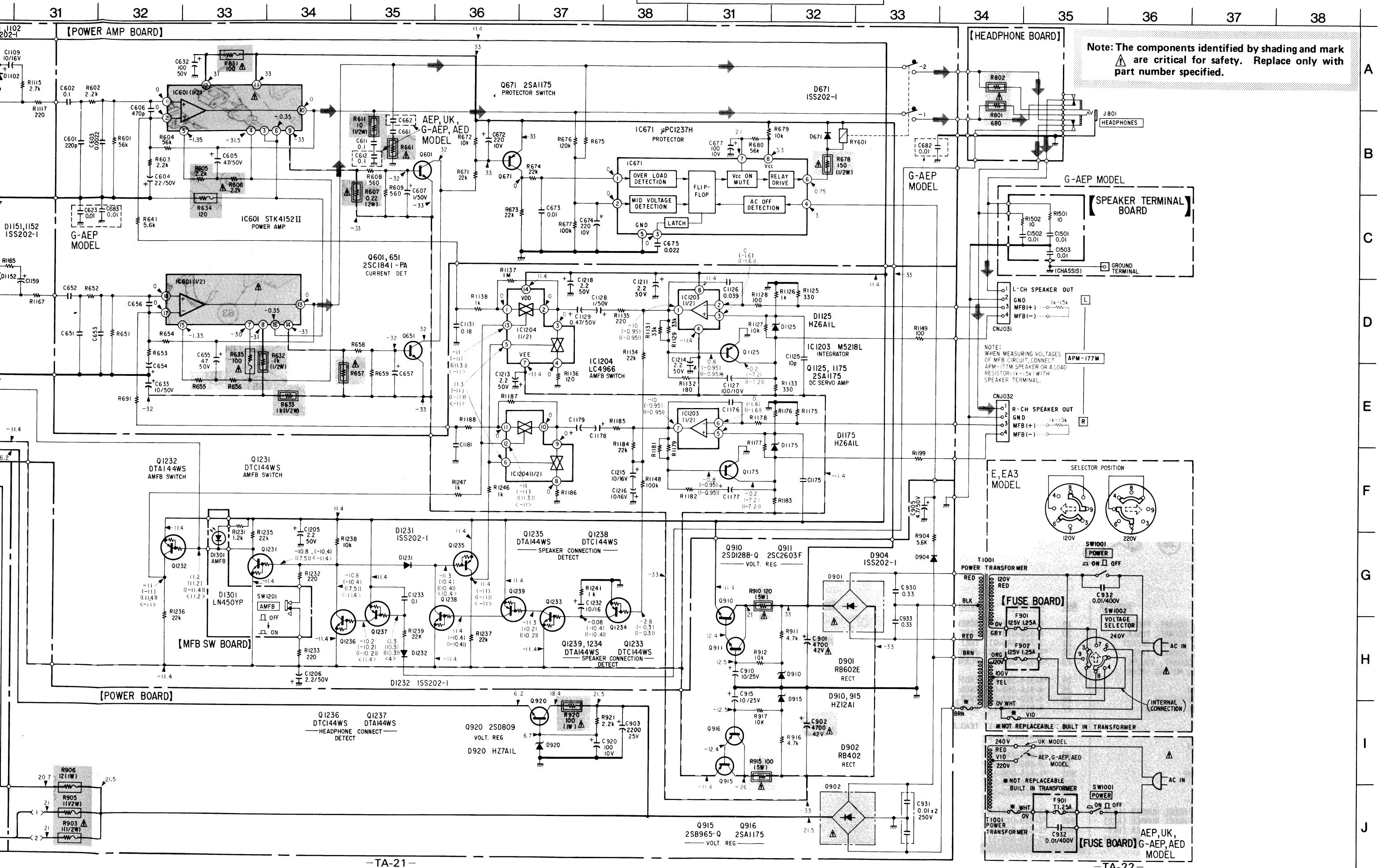


**FH-150R  
TA-177R**

**FH-150R  
TA-177R**





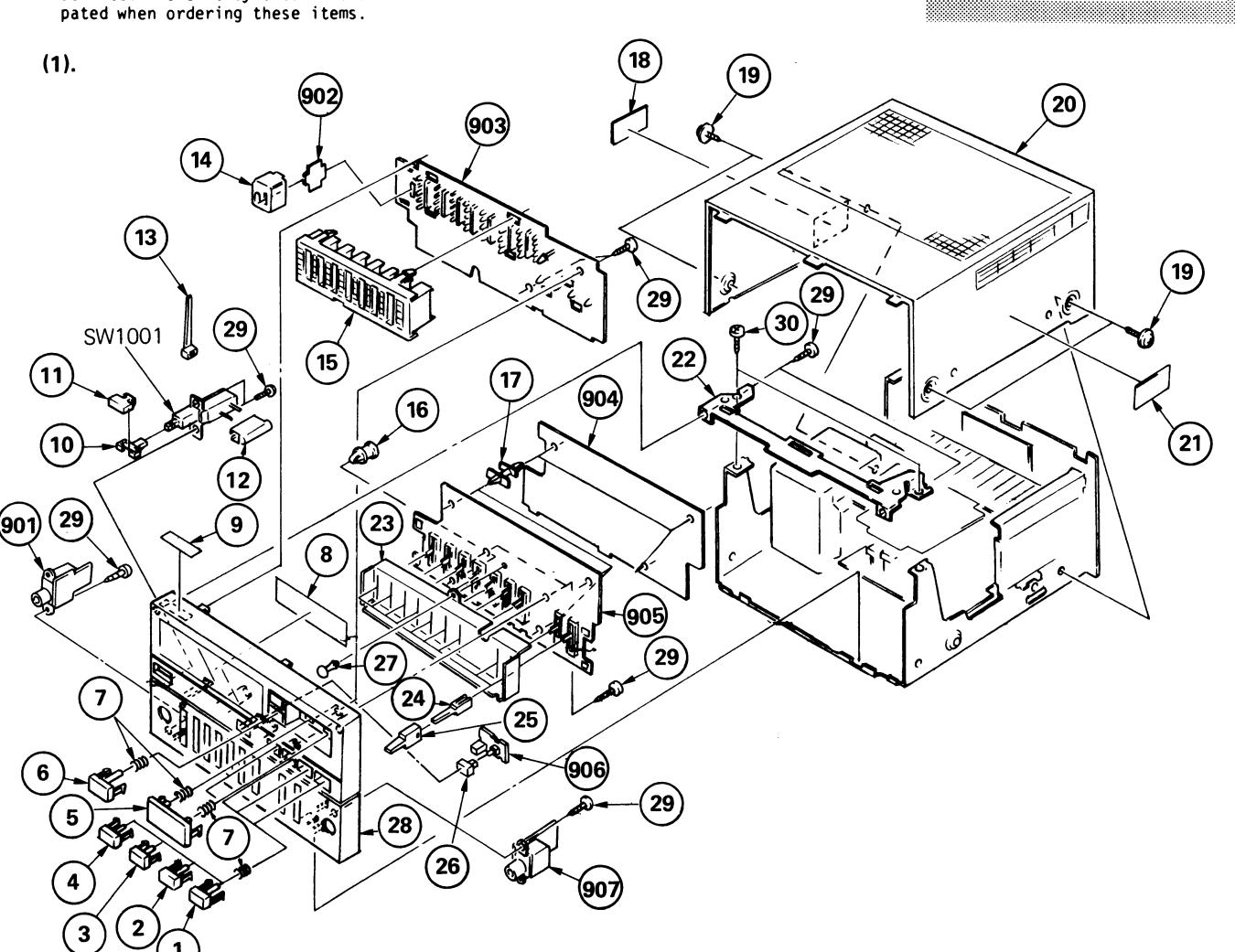


## 7. EXPLODED VIEWS AND PARTS LIST

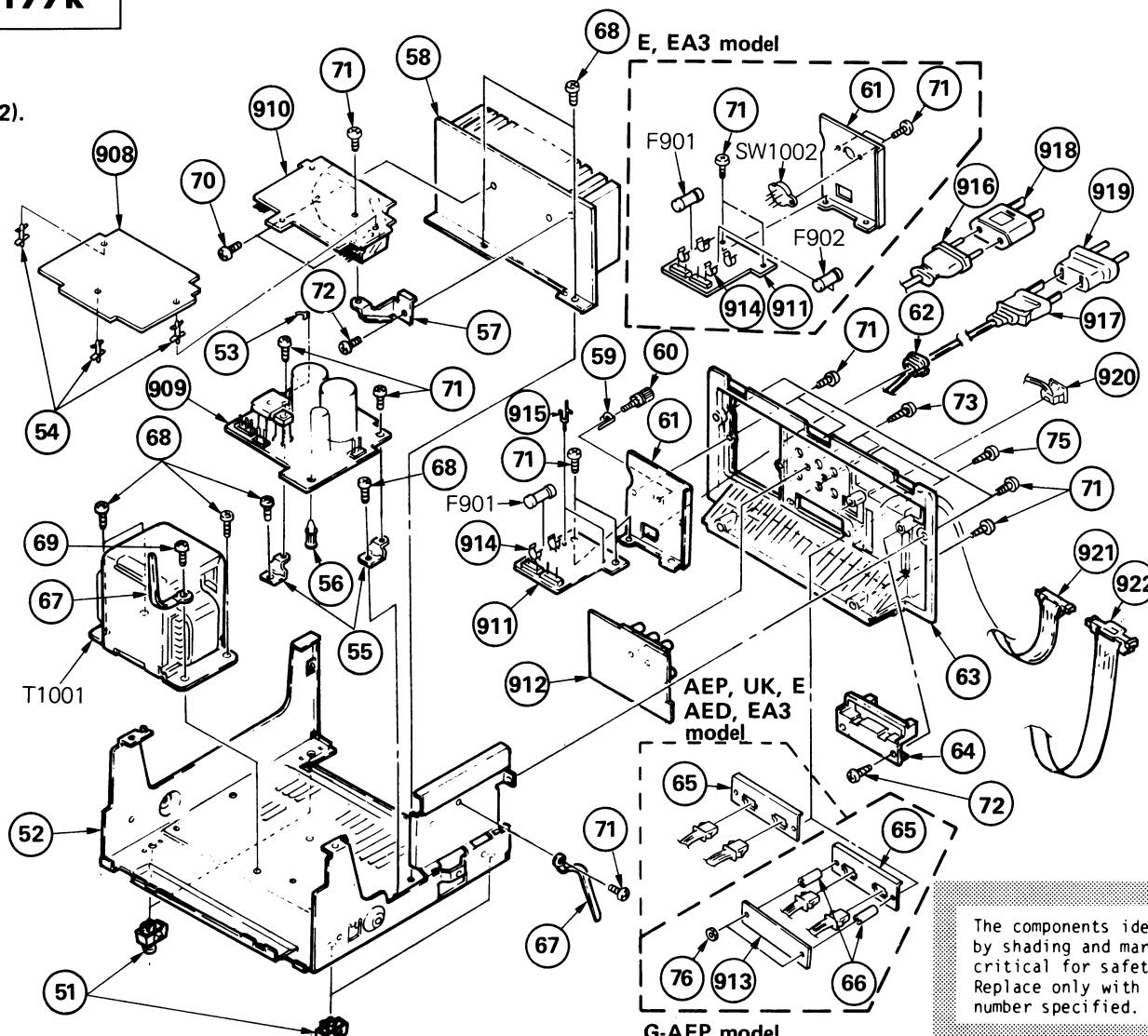
**NOTE:**  
The mechanical parts with no reference number in the exploded views are not supplied.

The construction parts of an assembled part are indicated with a callout number in the remark column.

The components identified by shading and mark **⚠** are critical for safety. Replace only with part number specified.



| No. | Part No.      | Description                           | Remarks | No. | Part No.             | Description                            | Remarks |
|-----|---------------|---------------------------------------|---------|-----|----------------------|--|---------|
| 1   | 4-914-350-31  | BUTTON (FUNCTION), SQUARE, PHONO      |         | 19  | 4-886-821-01         | SCREW, M3 CASE                         |         |
| 2   | 4-914-350-21  | BUTTON (FUNCTION), SQUARE, TUNER      |         | 20  | 4-910-078-31         | CASE                                   |         |
| 3   | 4-914-350-11  | BUTTON (FUNCTION), SQUARE, CD/AUX     |         | 21  | 3-703-845-01         | (UK)...LABEL (N)(UIC), MAIN CAUTION    |         |
| 4   | 4-914-350-01  | BUTTON (FUNCTION), SQUARE, TAPE       |         | 22  | *4-910-068-01        | JOINT                                  |         |
| 5   | 4-910-094-11  | BUTTON (UP-DOWN), SQUARE, VOLUME      |         | 23  | *4-914-353-01        | PLATE, BLIND                           |         |
| 6   | 4-910-087-61  | BUTTON (B), SQUARE, MUTING -20dB      |         | 24  | *4-914-351-01        | INDICATOR                              |         |
| 7   | 4-886-032-00  | SPRING, COMPRESSION                   |         | 25  | 4-914-352-01         | KNOB, SLIDE                            |         |
| 8   | *4-910-099-11 | PLATE (8 GANG), INDICATION            |         | 26  | 4-910-392-01         | KNOB, SQUARE, AMFB                     |         |
| 9   | 3-701-690-00  | (UK)...LABEL (MADE IN JAPAN)          |         | 27  | 4-812-134-11         | RIVET NYLON, 3.5                       |         |
| 10  | 4-910-058-01  | JOINT, KNOB                           |         | 28  | X-4910-050-1         | (EA3,E)...PANEL ASSY, FRONT            |         |
| 11  | 4-910-056-11  | KNOB, POWER                           |         |     | X-4910-050-2         | (G-AEP,AEP,UK,AED)...PANEL ASSY, FRONT |         |
| 12  | 3-575-524-00  | COVER, POWER SWITCH                   |         | 29  | 7-685-646-71         | SCREW +BVTP 3X8 TYPE2 N-S              |         |
| 13  | 3-701-748-00  | CLAMP                                 |         | 30  | 7-685-871-01         | SCREW +BVTT 3X6 (S)                    |         |
| 14  | *4-910-301-01 | PLATE, SHIELD                         |         | 901 | *1-619-008-11        | PC BOARD, HP                           |         |
| 15  | *4-910-306-01 | HOUSE (8 GANG), LAMP                  |         | 902 | *1-619-014-11        | PC BOARD, PHR                          |         |
| 16  | *3-669-610-00 | SPACER                                |         | 903 | *1-619-013-11        | PC BOARD, SPM                          |         |
| 17  | 3-659-619-01  | HOLDER, PC BOARD                      |         | 904 | *A-4375-251-A        | MOUNTED PCB, CONTROL                   |         |
| 18  | *4-914-325-01 | (E,EA3)...LABEL, MODEL NUMBER (E2/E3) |         | 905 | *1-619-011-11        | PC BOARD, GRAPHIC EQ                   |         |
|     | *4-914-326-11 | (AEP,AED)...LABEL, MODEL NUMBER (AE2) |         | 906 | *1-619-039-11        | PC BOARD, MFB SW                       |         |
|     | *4-914-327-01 | (UK)...LABEL, MODEL NUMBER (UK)       |         | 907 | *1-619-009-11        | PC BOARD, MIC                          |         |
|     | *4-914-328-01 | (G-AEP)...LABEL, MODEL NUMBER (AE4)   |         |     | ASW1001.1-553-318-51 | SWITCH, PUSH (AC POWER)(1 KEY), POWER  |         |



| No. | Part No.      | Description       | Remarks | No. | Part No.      | Description                                  | Remarks |
|-----|---------------|-------------------|---------|-----|---------------|--|---------|
| 51  | X-4902-937-1  | FOOT ASSY, RUBBER |         | 76  | 7-684-023-04  | (G-AEP)...N 3, TYPE2                         |         |
| 52  | *4-902-974-01 | CHASSIS           |         | 908 | *A-4388-532-A | MONTEED PCB, MFB                             |         |
| 53  | *4-904-446-01 | PLATE, GROUND     |         | 909 | *A-4394-377-A | (G-AEP,AEP,UK,AED)...MONTEED PCB, POWER      |         |
| 54  | 3-659-619-01  | HOLDER, PC BOARD  |         |     | *A-4394-379-A | (EA3,E)...MONTEED PCB, POWER                 |         |
| 55  | *4-910-393-01 | BRACKET, PC BOARD |         | 56  | *3-669-610-00 | SPACER                                       |         |
|     |               |                   |         | 57  | *4-910-064-01 | BRACKET (H), PC BOARD                        |         |
|     |               |                   |         | 58  | *4-910-077-01 | HEAT SINK                                    |         |
|     |               |                   |         | 59  | 3-701-993-00  | (G-AEP)...SPACER, TERMINAL                   |         |
|     |               |                   |         | 60  | 3-706-165-00  | (G-AEP)...SCREW                              |         |
|     |               |                   |         | 61  | *4-910-073-01 | (G-AEP,AEP,UK,AED)...BRACKET, INLET          |         |
|     |               |                   |         |     | *4-910-073-11 | (EA3,E)...BRACKET, INLET                     |         |
|     |               |                   |         | 62  | 3-703-244-00  | (G-AEP,AEP,UK,AED,EA3)...BUSHING(2104), CORD |         |
|     |               |                   |         |     | 3-703-571-00  | (E)...BUSHING(4516), CORD                    |         |
|     |               |                   |         | 63  | *4-910-079-11 | PLATE, JACK                                  |         |
|     |               |                   |         | 64  | *4-910-302-01 | HOLDER (H), WIRE                             |         |
|     |               |                   |         | 65  | *4-910-390-01 | BRACKET, MFB                                 |         |
|     |               |                   |         | 66  | 3-654-603-00  | (G-AEP)...SPACER                             |         |
|     |               |                   |         | 67  | *3-703-150-11 | CLAMP  |         |
|     |               |                   |         | 68  | 7-682-546-04  | SCREW +BVTT 3X5 (S)                          |         |
|     |               |                   |         | 69  | 7-685-751-09  | SCREW +BVTT 3X6 (S)                          |         |
|     |               |                   |         | 70  | 7-685-650-71  | SCREW +BVTP 3X16 TYPE2 IT-3                  |         |
|     |               |                   |         | 71  | 7-685-871-01  | SCREW +BVTT 3X6 (S)                          |         |
|     |               |                   |         | 72  | 7-685-646-71  | SCREW +BVTP 3X8 TYPE2 IT-3                   |         |
|     |               |                   |         | 73  | 7-685-647-14  | SCREW +BVTP 3X10 TYPE2 N-S                   |         |
|     |               |                   |         | 75  | 7-685-877-01  | (G-AEP)...SCREW +BVTT 3X20                   |         |
|     |               |                   |         |     | 7-685-871-01  | (AEP,UK,AED,EA3,E)...SCREW +BVTT 3X6 (S)     |         |
|     |               |                   |         | 68  | E, EA3 model  |  |         |
|     |               |                   |         | 69  | F901          | SW1002                                       |         |
|     |               |                   |         | 70  | F902          |  |         |
|     |               |                   |         | 71  |               |  |         |
|     |               |                   |         | 72  |               |  |         |
|     |               |                   |         | 73  |               |  |         |
|     |               |                   |         | 74  |               |  |         |
|     |               |                   |         | 75  |               |  |         |
|     |               |                   |         | 76  |               |  |         |
|     |               |                   |         | 77  |               |  |         |
|     |               |                   |         | 78  |               |  |         |
|     |               |                   |         | 79  |               |  |         |
|     |               |                   |         | 80  |               |  |         |
|     |               |                   |         | 81  |               |  |         |
|     |               |                   |         | 82  |               |  |         |
|     |               |                   |         | 83  |               |  |         |
|     |               |                   |         | 84  |               |  |         |
|     |               |                   |         | 85  |               |  |         |
|     |               |                   |         | 86  |               |  |         |
|     |               |                   |         | 87  |               |  |         |
|     |               |                   |         | 88  |               |  |         |
|     |               |                   |         | 89  |               |  |         |
|     |               |                   |         | 90  |               |  |         |
|     |               |                   |         | 91  |               |  |         |
|     |               |                   |         | 92  |               |  |         |
|     |               |                   |         | 93  |               |  |         |
|     |               |                   |         | 94  |               |  |         |
|     |               |                   |         | 95  |               |  |         |
|     |               |                   |         | 96  |               |  |         |
|     |               |                   |         | 97  |               |  |         |
|     |               |                   |         | 98  |               |  |         |
|     |               |                   |         | 99  |               |  |         |
|     |               |                   |         | 100 |               |  |         |
|     |               |                   |         | 101 |               |  |         |
|     |               |                   |         | 102 |               |  |         |
|     |               |                   |         | 103 |               |  |         |
|     |               |                   |         | 104 |               |  |         |
|     |               |                   |         | 105 |               |  |         |
|     |               |                   |         | 106 |               |  |         |
|     |               |                   |         | 107 |               |  |         |
|     |               |                   |         | 108 |               |  |         |
|     |               |                   |         | 109 |               |  |         |
|     |               |                   |         | 110 |               |  |         |
|     |               |                   |         | 111 |               |  |         |
|     |               |                   |         | 112 |               |  |         |
|     |               |                   |         | 113 |               |  |         |
|     |               |                   |         | 114 |               |  |         |
|     |               |                   |         | 115 |               |  |         |
|     |               |                   |         | 116 |               |  |         |
|     |               |                   |         | 117 |               |  |         |

## 8. ELECTRIC

**NOTE:**  
Items marked with **⚠** are selected for service. Some are selected when ordered.  
If there are set such as a typical circuit, capacitors and circuits may be

Ref.No. Part No.

901 \*1-619-

902 \*1-619-

903 \*1-619-

904 \*A-4375-

905 \*1-619-

906 \*1-619-

907 \*1-619-

908 \*1-619-

909 \*A-4394-

910 \*A-4388-

911 \*1-618-

912 \*1-619-

913 \*1-619-

914 1-533-

915 1-535-

916 △.1-534-

917 △.1-551-

918 △.1-506-

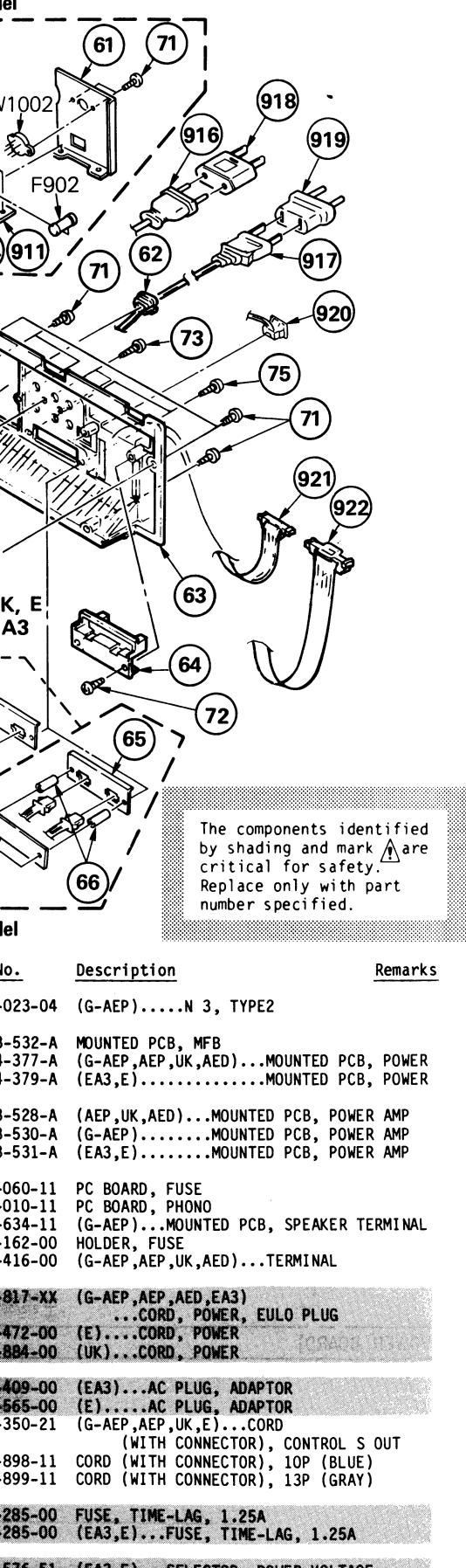
919 △.1-526-

920 1-558-

921 1-557-

922 1-557-

BP002 \*



## 8. ELECTRICAL PARTS LIST

### NOTE:

- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:  
MF:μF, PF:μμF.

RESISTORS:  
• All resistors are in ohms.

• F : nonflammable

COILS:  
• MMH : mH, UH : μH

SEMICONDUCTORS:  
In each case, U : μ, for example:  
UA...: μA..., UPA...: μPA..., UPC...: μPC,  
UPD...: μPD...

**Note:**  
**EA3: Saudi Arabia model**  
**AED: DENMARK model**

The components identified by shading and mark ▲ are critical for safety.  
Replace only with part number specified.

### ELECTRICAL PARTS

| Ref.No. | Part No.       | Description   |
|---------|----------------|---|
| 901     | *1-619-008-11  | PC BOARD, HP  |
| 902     | *1-619-014-11  | PC BOARD, PHR   |
| 903     | *1-619-013-11  | PC BOARD, SPM   |
| 904     | *A-4375-251-A  | MOUNTED PCB, CONTROL  |
| 905     | *1-619-011-11  | PC BOARD, GRAPHIC EQ  |
| 906     | *1-619-039-11  | PC BOARD, MFB SW  |
| 907     | *1-619-009-11  | PC BOARD, MIC   |
| 908     | *A-4388-532-A  | MOUNTED PCB, MFB  |
| 909     | *A-4394-377-A  | (G-AEP,AEP,UK,AED)<br>...MOUNTED PCB, POWER                 |
|         | *A-4394-379-A  | (EA3,E).....MOUNTED PCB, POWER                              |
| 910     | *A-4388-528-A  | (AEP,UK,AED)...MOUNTED PCB, POWER AMP                       |
|         | *A-4388-530-A  | (G-AEP).....MOUNTED PCB, POWER AMP                          |
|         | *A-4388-531-A  | (EA3,E).....MOUNTED PCB, POWER AMP                          |
| 911     | *1-618-060-11  | PC BOARD, FUSE  |
| 912     | *1-619-010-11  | PC BOARD, PHONO   |
| 913     | *1-619-634-11  | (G-AEP)...MOUNTED PCB, SPEAKER TERMINAL                     |
| 914     | 1-533-162-00   | HOLDER, FUSE  |
| 915     | 1-535-416-00   | (G-AEP,AEP,UK,AED)...TERMINAL                               |
| 916     | ▲.1-534-817-XX | (G-AEP,AEP,AED,EA3)<br>...CORD, POWER, EUO PLUG             |
| 917     | ▲.1-551-472-00 | (E)...CORD, POWER   |
|         | ▲.1-551-884-00 | (UK)...CORD, POWER  |
| 918     | ▲.1-506-409-00 | (EA3)...AC PLUG, ADAPTOR                                    |
| 919     | ▲.1-526-565-00 | (E)...AC PLUG, ADAPTOR                                      |
| 920     | 1-558-350-21   | (G-AEP,AEP,UK,E)<br>...CORD (WITH CONNECTOR), CONTROL S OUT |
| 921     | 1-557-898-11   | CORD (WITH CONNECTOR), 10P (BLUE)                           |
| 922     | 1-557-899-11   | CORD (WITH CONNECTOR), 13P (GRAY)                           |
| BP002   | *1-535-141-00  | BASE POST 22MM (10MM PITCH) 4P                              |
| BP901   | *1-535-116-00  | TERMINAL  |
| BP902   | *1-535-115-00  | TERMINAL  |
| BP903   | *1-535-115-00  | TERMINAL  |
| C011    | 1-131-347-00   | TANTALUM 1MF 10% 35V  |
| C012    | 1-131-368-00   | TANTALUM 3.3MF 10% 16V                                      |
| C013    | 1-131-377-00   | TANTALUM 10MF 20% 10V                                       |
| C014    | 1-102-112-00   | CERAMIC 330PF 10% 50V                                       |
| C101    | 1-123-612-00   | ELECT 2.2MF 20% 50V   |
| C102    | 1-162-288-31   | CERAMIC 330PF 10% 50V                                       |
| C103    | 1-123-612-00   | ELECT 2.2MF 20% 50V   |
| C104    | 1-110-197-00   | MYLAR 0.0015MF 5% 50V                                       |
| C105    | 1-110-204-00   | MYLAR 0.0056MF 5% 50V                                       |
| C106    | 1-123-612-00   | ELECT 2.2MF 20% 50V   |
| C107    | 1-123-617-00   | ELECT 10MF 20% 16V  |
| C111    | 1-136-165-00   | FILM 0.1MF 5% 50V   |
| C115    | 1-162-294-31   | CERAMIC 0.001MF 10% 50V                                     |
| C116    | 1-162-291-31   | (G-AEP)...CERAMIC 560PF 10% 50V                             |
| C117    | 1-162-291-31   | (G-AEP)...CERAMIC 560PF 10% 50V                             |

### ELECTRICAL PARTS

| Ref.No. | Part No.     | Description                     |
|---------|--------------|---------------------------------|
| C151    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C152    | 1-162-288-31 | CERAMIC 330PF 10% 50V           |
| C153    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C154    | 1-110-197-00 | MYLAR 0.0015MF 5% 50V           |
| C155    | 1-110-204-00 | MYLAR 0.0056MF 5% 50V           |
| C156    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C157    | 1-123-617-00 | ELECT 10MF 20% 16V              |
| C165    | 1-162-294-31 | CERAMIC 0.001MF 10% 50V         |
| C166    | 1-162-291-31 | (G-AEP)...CERAMIC 560PF 10% 50V |
| C167    | 1-162-291-31 | (G-AEP)...CERAMIC 560PF 10% 50V |
| C201    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C202    | 1-162-288-31 | CERAMIC 330PF 10% 50V           |
| C212    | 1-162-282-31 | CERAMIC 100PF 10% 50V           |
| C251    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C252    | 1-162-288-31 | CERAMIC 330PF 10% 50V           |
| C262    | 1-162-282-31 | CERAMIC 100PF 10% 50V           |
| C303    | 1-162-284-31 | CERAMIC 150PF 10% 50V           |
| C304    | 1-162-284-31 | CERAMIC 150PF 10% 50V           |
| C305    | 1-123-617-00 | ELECT 10MF 20% 16V              |
| C310    | 1-131-343-00 | TANTALUM 0.22MF 10% 35V         |
| C311    | 1-123-622-00 | ELECT 22MF 20% 16V              |
| C312    | 1-123-617-00 | ELECT 10MF 20% 16V              |
| C315    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V          |
| C316    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V          |
| C317    | 1-123-616-00 | ELECT 4.7MF 20% 25V             |
| C318    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C349    | 1-123-622-00 | ELECT 22MF 20% 16V              |
| C350    | 1-123-622-00 | ELECT 22MF 20% 16V              |
| C351    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C352    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C353    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C354    | 1-123-612-00 | ELECT 2.2MF 20% 50V             |
| C355    | 1-123-617-00 | ELECT 10MF 20% 16V              |
| C356    | 1-123-622-00 | ELECT 22MF 20% 16V              |
| C357    | 1-123-617-00 | ELECT 10MF 20% 16V              |
| C375    | 1-162-302-31 | CERAMIC 0.0022MF 30% 16V        |
| C376    | 1-162-302-31 | CERAMIC 0.0022MF 30% 16V        |
| C377    | 1-162-302-31 | CERAMIC 0.0022MF 30% 16V        |
| C381    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V          |
| C382    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V          |
| C383    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V          |
| C385    | 1-162-302-31 | CERAMIC 0.0022MF 30% 16V        |
| C387    | 1-162-294-31 | CERAMIC 0.001MF 10% 50V         |
| C388    | 1-123-617-00 | ELECT 10MF 20% 16V              |
| C395    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V          |

### ELECTRICAL PARTS

| Ref.No. | Part No.     | Description              |
|---------|--------------|--------------------------|
| C399    | 1-162-294-31 | CERAMIC 0.001MF 10% 50V  |
| C413    | 1-131-371-00 | TANTALUM 10MF 10% 16V    |
| C419    | 1-162-288-31 | CERAMIC 330PF 10% 50V    |
| C423    | 1-131-371-00 | TANTALUM 10MF 10% 16V    |
| C431    | 1-131-346-00 | TANTALUM 0.68MF 10% 35V  |
| C432    | 1-131-344-00 | TANTALUM 0.33MF 10% 35V  |
| C433    | 1-131-341-00 | TANTALUM 0.1MF 10% 35V   |
| C434    | 1-136-161-00 | FILM 0.047MF 5% 50V      |
| C435    | 1-162-306-31 | CERAMIC 0.01MF 20% 16V   |
| C436    | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V |
| C437    | 1-162-303-31 | CERAMIC 0.0033MF 20% 16V |
| C438    | 1-131-342-00 | TANTALUM 0.15MF 10% 35V  |
| C439    | 1-136-161-00 | FILM 0.047MF 5% 50V      |
| C440    | 1-162-596-00 | CERAMIC 0.022MF 20% 25V  |
| C441    | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V |
| C442    | 1-162-302-31 | CERAMIC 0.0022MF 20% 16V |
| C443    | 1-162-294-31 | CERAMIC 0.001MF 10% 50V  |
| C444    | 1-162-291-31 | CERAMIC 560PF 10% 50V    |
| C451    | 1-131-371-00 | TANTALUM 10MF 10% 16V    |
| C452    | 1-131-371-00 | TANTALUM 10MF 10% 16V    |
| C461    | 1-162-306-31 | CERAMIC 0.01MF 30% 16V   |
| C469    | 1-162-288-31 | CERAMIC 330PF 10% 50V    |
| C471    | 1-131-346-00 | TANTALUM 0.68MF 10% 35V  |
| C472    | 1-131-344-00 | TANTALUM 0.33MF 10% 35V  |
| C473    | 1-131-341-00 | TANTALUM 0.1MF 10% 35V   |
| C474    | 1-136-161-00 | FILM 0.047MF 5% 50V      |
| C475    | 1-162-306-31 | CERAMIC 0.01MF 20% 16V   |
| C476    | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V |
| C477    | 1-162-303-31 | CERAMIC 0.0033MF 20% 16V |
| C478    | 1-131-342-00 | TANTALUM 0.15MF 10% 35V  |
| C479    | 1-136-161-00 | FILM 0.047MF 5% 50V      |
| C480    | 1-162-596-00 | CERAMIC 0.022MF 20% 25V  |
| C481    | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V |
| C482    | 1-162-302-31 | CERAMIC 0.0022MF 20% 16V |
| C483    | 1-162-294-31 | CERAMIC 0.001MF 10% 50V  |
| C484    | 1-162-291-31 | CERAMIC 560PF 10% 50V    |
| C485    | 1-123-611-00 | ELECT 1MF 20% 50V        |
| C502    | 1-123-611-00 | ELECT 1MF 20% 50V        |

| ELECTRICAL PARTS |              |                          | ELECTRICAL PARTS |               |   | ELECTRICAL PARTS |              |                       | ELECTRICAL PARTS     |                    |                  |
|------------------|--------------|--------------------------|------------------|---------------|---|------------------|--------------|-----------------------|----------------------|--------------------|------------------|
| Ref.No.          | Part No.     | Description              | Ref.No.          | Part No.      | Description                             | Ref.No.          | Part No.     | Description           | Ref.No.              | Part No.           | Description      |
| C399             | 1-162-294-31 | CERAMIC 0.001MF 10% 50V  | C656             | 1-162-290-31  | CERAMIC 470PF 10% 50V                   | C1109            | 1-123-617-00 | ELECT 10MF 20% 16V    | CN601 *1-560-070-00  | BASE POST 5P       |                  |
| C413             | 1-131-371-00 | TANTALUM 10MF 10% 16V    | C657             | 1-123-380-00  | ELECT 1MF 20% 50V                       | C1111            | 1-123-611-00 | ELECT 1MF 20% 50V     | CN603 *1-560-070-00  | BASE POST 5P       |                  |
| C419             | 1-162-288-31 | CERAMIC 330PF 10% 50V    | C661             | 1-136-165-00  | FILM 0.1MF 5% 50V                       | C1112            | 1-162-288-31 | CERAMIC 330PF 10% 50V | CN903 *1-560-063-00  | PIN, CONNECTOR 5P  |                  |
| C423             | 1-131-371-00 | TANTALUM 10MF 10% 16V    | C662             | 1-136-165-00  | (G-AEP,AEP,UK,AED)... FILM 0.1MF 5% 50V | C1125            | 1-162-199-11 | CERAMIC 10PF 10% 50V  | CN1101 *1-564-506-11 | PLUG, CONNECTOR 3P |                  |
| C431             | 1-131-346-00 | TANTALUM 0.68MF 10% 35V  | C672             | 1-123-308-00  | ELECT 220MF 20% 10V                     | C1126            | 1-136-160-00 | FILM 0.039MF 5% 50V   | CN1102 *1-564-507-11 | PLUG, CONNECTOR 4P |                  |
| C432             | 1-131-344-00 | TANTALUM 0.33MF 10% 35V  | C673             | 1-162-306-31  | CERAMIC 0.01MF 30% 16V                  | C1127            | 1-123-307-00 | ELECT 100MF 20% 10V   | CN1103 *1-564-338-00 | PIN, CONNECTOR 4P  |                  |
| C433             | 1-131-341-00 | TANTALUM 0.1MF 10% 35V   | C674             | 1-123-308-00  | ELECT 220MF 20% 10V                     | C1128            | 1-123-611-00 | ELECT 1MF 20% 50V     | CN1104 *1-564-506-11 | PLUG, CONNECTOR 3P |                  |
| C434             | 1-136-161-00 | FILM 0.047MF 5% 50V      | C675             | 1-136-157-00  | FILM 0.022MF 5% 50V                     | C1129            | 1-123-610-00 | ELECT 0.47MF 20% 50V  | CN1105 *1-564-505-11 | PLUG, CONNECTOR 2P |                  |
| C435             | 1-162-306-31 | CERAMIC 0.01MF 20% 16V   | C677             | 1-123-307-00  | ELECT 100MF 20% 10V                     | C1131            | 1-136-168-00 | FILM 0.18MF 5% 50V    | CN1106 *1-564-506-11 | PLUG, CONNECTOR 3P |                  |
| C436             | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V | C682             | 1-161-330-00  | (G-AEP)...CERAMIC 0.01MF 30% 25V        | C1151            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | CN1107 *1-564-507-11 | PLUG, CONNECTOR 4P |                  |
| C437             | 1-162-303-31 | CERAMIC 0.0033MF 20% 16V | C683             | 1-162-306-31  | (G-AEP)...CERAMIC 0.01MF 30% 16V        | C1152            | 1-136-165-00 | FILM 0.1MF 5% 50V     | D011                 | 8-719-110-32       | DIODE PH302B     |
| C438             | 1-131-342-00 | TANTALUM 0.15MF 10% 35V  | C701             | 1-131-355-00  | TANTALUM 2.2MF 10% 25V                  | C1153            | 1-136-165-00 | FILM 0.1MF 5% 50V     | D301                 | 8-719-911-19       | DIODE ISS119     |
| C439             | 1-136-161-00 | FILM 0.047MF 5% 50V      | C702             | 1-131-371-00  | TANTALUM 10MF 10% 16V                   | C1154            | 1-162-282-31 | CERAMIC 100PF 10% 50V | D302                 | 8-719-911-19       | DIODE ISS119     |
| C440             | 1-162-596-00 | CERAMIC 0.022MF 25V      | C711             | 1-131-344-00  | TANTALUM 0.33MF 10% 35V                 | C1155            | 1-136-160-00 | FILM 0.039MF 5% 50V   | D303                 | 8-719-911-19       | DIODE ISS119     |
| C441             | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V | C712             | 1-136-161-00  | FILM 0.047MF 5% 50V                     | C1156            | 1-136-157-00 | FILM 0.022MF 5% 50V   | D304                 | 8-719-911-19       | DIODE ISS119     |
| C442             | 1-162-302-31 | CERAMIC 0.0022MF 20% 16V | C713             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1157            | 1-123-617-00 | ELECT 10MF 20% 16V    | D311                 | 8-719-911-19       | DIODE ISS119     |
| C443             | 1-162-294-31 | CERAMIC 0.001MF 10% 50V  | C721             | 1-131-342-00  | TANTALUM 0.15MF 10% 35V                 | C1158            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D312                 | 8-719-911-19       | DIODE ISS119     |
| C444             | 1-162-291-31 | CERAMIC 560PF 10% 50V    | C722             | 1-162-596-00  | CERAMIC 0.022MF 10% 25V                 | C1159            | 1-123-617-00 | ELECT 10MF 20% 16V    | D321                 | 8-719-910-61       | DIODE HZ6A1L     |
| C451             | 1-131-371-00 | TANTALUM 10MF 10% 16V    | C723             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1161            | 1-123-611-00 | ELECT 1MF 20% 50V     | D401                 | 1-807-013-11       | DIODE AA3422K    |
| C452             | 1-131-371-00 | TANTALUM 10MF 10% 16V    | C731             | 1-136-162-00  | FILM 0.056MF 5% 50V                     | C1162            | 1-162-288-31 | CERAMIC 330PF 10% 50V | D402                 | 1-807-013-11       | DIODE AA3422K    |
| C461             | 1-162-306-31 | CERAMIC 0.01MF 30% 16V   | C732             | 1-161-012-00  | CERAMIC 0.0082MF 10% 25V                | C1163            | 1-136-160-00 | FILM 0.039MF 5% 50V   | D411                 | 1-807-013-11       | DIODE AA3422K    |
| C469             | 1-162-288-31 | CERAMIC 330PF 10% 50V    | C733             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1164            | 1-123-611-00 | ELECT 1MF 20% 50V     | D412                 | 1-807-013-11       | DIODE AA3422K    |
| C471             | 1-131-346-00 | TANTALUM 0.68MF 10% 35V  | C741             | 1-162-596-00  | CERAMIC 0.022MF 10% 25V                 | C1165            | 1-162-199-11 | CERAMIC 10PF 10% 50V  | D413                 | 1-807-013-11       | DIODE AA3422K    |
| C472             | 1-131-344-00 | TANTALUM 0.33MF 10% 35V  | C742             | 1-162-303-31  | CERAMIC 0.0033MF 30% 16V                | C1166            | 1-136-160-00 | FILM 0.18MF 5% 50V    | D414                 | 1-807-013-11       | DIODE AA3422K    |
| C473             | 1-131-341-00 | TANTALUM 0.1MF 10% 35V   | C743             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1167            | 1-123-307-00 | ELECT 100MF 20% 10V   | D415                 | 1-807-013-11       | DIODE AA3422K    |
| C474             | 1-136-161-00 | FILM 0.047MF 5% 50V      | C751             | 1-162-306-31  | CERAMIC 0.01MF 30% 16V                  | C1168            | 1-136-168-00 | FILM 0.47MF 20% 50V   | D416                 | 1-807-013-11       | DIODE AA3422K    |
| C475             | 1-162-306-31 | CERAMIC 0.01MF 20% 16V   | C752             | 1-162-301-31  | CERAMIC 0.0015MF 30% 16V                | C1169            | 1-123-610-00 | ELECT 0.18MF 20% 50V  | D417                 | 1-807-013-11       | DIODE AA3422K    |
| C476             | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V | C753             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1201            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D671                 | 8-719-911-19       | DIODE ISS119     |
| C477             | 1-162-303-31 | CERAMIC 0.0033MF 20% 16V | C761             | 1-161-046-00  | CERAMIC 0.0039MF 10% 25V                | C1202            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D701                 | 8-719-301-38       | DIODE SEL2210S-C |
| C478             | 1-131-342-00 | TANTALUM 0.15MF 10% 35V  | C762             | 1-162-291-31  | CERAMIC 560PF 10% 50V                   | C1203            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D702                 | 8-719-301-38       | DIODE SEL2210S-C |
| C479             | 1-136-161-00 | FILM 0.047MF 5% 50V      | C763             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1204            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D703                 | 8-719-301-38       | DIODE SEL2210S-C |
| C480             | 1-162-596-00 | CERAMIC 0.022MF 25V      | C771             | 1-161-041-00  | CERAMIC 0.0015MF 10% 25V                | C1205            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D704                 | 8-719-301-38       | DIODE SEL2210S-C |
| C481             | 1-162-305-31 | CERAMIC 0.0068MF 20% 16V | C772             | 1-162-286-31  | CERAMIC 220PF 10% 50V                   | C1206            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D705                 | 8-719-301-38       | DIODE SEL2210S-C |
| C482             | 1-162-302-31 | CERAMIC 0.0022MF 20% 16V | C773             | 1-131-356-00  | TANTALUM 3.3MF 10% 25V                  | C1207            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D706                 | 8-719-907-80       | DIODE AA5535S    |
| C483             | 1-162-294-31 | CERAMIC 0.001MF 10% 50V  | C791             | 1-131-371-00  | TANTALUM 10MF 10% 16V                   | C1213            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D711                 | 8-719-301-43       | DIODE SEL2410E-C |
| C484             | 1-162-291-31 | CERAMIC 560PF 10% 50V    | C792             | 1-162-306-31  | CERAMIC 4700MF 20% 42V                  | C1214            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D712                 | 8-719-300-95       | DIODE SEL2710K   |
| C502             | 1-123-611-00 | ELECT 1MF 20% 50V        | C793             | 1-131-355-00  | TANTALUM 2.2MF 10% 25V                  | C1215            | 1-123-617-00 | ELECT 10MF 20% 16V    | D713                 | 8-719-301-60       | DIODE SEL2910A-C |
| C503             | 1-161-055-00 | CERAMIC 0.022MF 25V      | C901             | ▲1-124-362-00 | ELECT 4700MF 20% 42V                    | C1216            | 1-123-617-00 | ELECT 10MF 20% 16V    | D714                 | 8-719-301-52       | DIODE SEL2810A-C |
| C504             | 1-123-622-00 | ELECT 22MF 20% 16V       | C902             | ▲1-124-362-00 | ELECT 4700MF 20% 42V                    | C1217            | 1-123-612-00 | ELECT 2.2MF 20% 50V   | D715                 | 8-719-301-38       | DIODE SEL2210S-C |
| C505             | 1-123-611-00 | ELECT 1MF 20% 50V        | C903             | 1-123-338-00  | ELECT 2200MF 20% 25V                    | C1218            |              |                       |                      |                    |                  |

**FH-150R**  
**TA-177R**

**FH-150R**  
**TA-177R**

ELECTRICAL PARTS

| Ref.No. | Part No. | Description   | 10MF           | 20%     | 16V    |     |     |
|---------|----------|---------------|----------------|---------|--------|-----|-----|
| 50V     | C1109    | 1-123-617-00  | ELECT          | 10MF    | 20%    | 16V |     |
| 50V     | C1111    | 1-123-611-00  | ELECT          | 1MF     | 20%    | 50V |     |
| 50V     | C1112    | 1-162-288-31  | CERAMIC        | 330PF   | 10%    | 50V |     |
|         |          |               |                |         |        |     |     |
| 50V     | C1125    | 1-162-199-11  | CERAMIC        | 10PF    | 10%    | 50V |     |
| %       | C1126    | 1-136-160-00  | FILM           | 0.039MF | 5%     | 50V |     |
| 10V     | C1127    | 1-123-307-00  | ELECT          | 100MF   | 20%    | 10V |     |
| %       |          |               |                |         |        |     |     |
| 16V     | C1128    | 1-123-611-00  | ELECT          | 1MF     | 20%    | 50V |     |
| %       | C1129    | 1-123-610-00  | ELECT          | 0.47MF  | 20%    | 50V |     |
| 50V     | C1131    | 1-136-168-00  | FILM           | 0.18MF  | 5%     | 50V |     |
| %       |          |               |                |         |        |     |     |
| 10V     | C1151    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 30%     | C1152    | 1-136-165-00  | FILM           | 0.1MF   | 5%     | 50V |     |
| 30%     | C1153    | 1-136-165-00  | FILM           | 0.1MF   | 5%     | 50V |     |
| %       |          |               |                |         |        |     |     |
| 25V     | C1154    | 1-162-282-31  | CERAMIC        | 100PF   | 10%    | 50V |     |
| 16V     | C1155    | 1-136-160-00  | FILM           | 0.039MF | 5%     | 50V |     |
| 35V     | C1156    | 1-136-157-00  | FILM           | 0.022MF | 5%     | 50V |     |
| %       |          |               |                |         |        |     |     |
| 50V     | C1157    | 1-123-617-00  | ELECT          | 10MF    | 20%    | 16V |     |
| 25V     | C1158    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 35V     | C1159    | 1-123-617-00  | ELECT          | 10MF    | 20%    | 16V |     |
| %       |          |               |                |         |        |     |     |
| 25V     | C1161    | 1-123-611-00  | ELECT          | 1MF     | 20%    | 50V |     |
| 25V     | C1162    | 1-162-288-31  | CERAMIC        | 330PF   | 10%    | 50V |     |
| 50V     | C1175    | 1-162-199-11  | CERAMIC        | 10PF    | 10%    | 50V |     |
| %       |          |               |                |         |        |     |     |
| 25V     | C1176    | 1-136-160-00  | FILM           | 0.039MF | 5%     | 50V |     |
| 25V     | C1177    | 1-123-307-00  | ELECT          | 100MF   | 20%    | 10V |     |
| 25V     | C1178    | 1-123-611-00  | ELECT          | 1MF     | 20%    | 50V |     |
| %       |          |               |                |         |        |     |     |
| 16V     | C1179    | 1-123-610-00  | ELECT          | 0.47MF  | 20%    | 50V |     |
| 25V     | C1181    | 1-136-168-00  | FILM           | 0.18MF  | 5%     | 50V |     |
| 16V     | C1201    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| %       |          |               |                |         |        |     |     |
| 16V     | C1202    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 25V     | C1203    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 25V     | C1204    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| %       |          |               |                |         |        |     |     |
| 50V     | C1205    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 25V     | C1206    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 25V     | C1211    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| %       |          |               |                |         |        |     |     |
| 50V     | C1213    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 25V     | C1214    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 16V     | C1215    | 1-123-617-00  | ELECT          | 10MF    | 20%    | 16V |     |
| %       |          |               |                |         |        |     |     |
| 16V     | C1216    | 1-123-617-00  | ELECT          | 10MF    | 20%    | 16V |     |
| 42V     | C1218    | 1-123-612-00  | ELECT          | 2.2MF   | 20%    | 50V |     |
| 42V     | C1231    | 1-162-306-31  | CERAMIC        | 0.01MF  | 30%    | 16V |     |
| %       |          |               |                |         |        |     |     |
| 25V     | C1232    | 1-123-617-00  | ELECT          | 10MF    | 20%    | 16V |     |
| 50V     | C1233    | 1-136-165-00  | FILM           | 0.1MF   | 5%     | 50V |     |
| %       |          |               |                |         |        |     |     |
| 25V     | C1501    | 1-161-330-00  | (G-AEP)...     | CERAMIC | 0.01MF | 30% | 25V |
| 25V     | C1502    | 1-161-330-00  | (G-AEP)...     | CERAMIC | 0.01MF | 30% | 25V |
| 10V     | C1503    | 1-161-330-00  | (G-AEP)...     | CERAMIC | 0.01MF | 30% | 25V |
| %       |          |               |                |         |        |     |     |
| 50V     | CN201    | *1-560-061-00 | PIN, CONNECTOR | 3P      |        |     |     |
| 250V    | CN202    | *1-560-064-00 | PIN, CONNECTOR | 6P      |        |     |     |
| 400V    | CN203    | *1-560-063-00 | PIN, CONNECTOR | 5P      |        |     |     |
| %       |          |               |                |         |        |     |     |
| 50V     | CN204    | *1-560-066-00 | PIN, CONNECTOR | 10P     |        |     |     |
| 50V     | CN205    | *1-560-060-00 | PIN, CONNECTOR | 2P      |        |     |     |
| 50V     | CN206    | *1-560-065-00 | PIN, CONNECTOR | 8P      |        |     |     |
| %       |          |               |                |         |        |     |     |
| 50V     | CN208    | *1-564-496-11 | PIN, CONNECTOR | 3P      |        |     |     |
| 50V     | CN216    | *1-560-062-00 | PIN, CONNECTOR | 4P      |        |     |     |
| 50V     | CN217    | *1-560-603-00 | PIN, CONNECTOR | 4P      |        |     |     |
| %       |          |               |                |         |        |     |     |
| 50V     | CN401    | *1-564-501-11 | PIN, CONNECTOR | 8P      |        |     |     |
| 16V     | CN402    | *1-564-496-11 | PIN, CONNECTOR | 3P      |        |     |     |
| 50V     | CN403    | *1-564-112-21 | PIN, CONNECTOR | 3P      |        |     |     |

ELECTRICAL PARTS

| Ref.No. | Part No. | Description | CN601  | *1-560-070-00  | BASE POST 5P                    |
|---------|----------|-------------|--------|----------------|---------------------------------|
|         |          |             | CN603  | *1-560-070-00  | BASE POST 5P                    |
|         |          |             | CN903  | *1-560-063-00  | PIN, CONNECTOR 5P               |
|         |          |             | CN1101 | *1-564-506-11  | PLUG, CONNECTOR 3P              |
|         |          |             | CN1102 | *1-564-507-11  | PLUG, CONNECTOR 4P              |
|         |          |             | CN1103 | *1-564-338-00  | PIN, CONNECTOR 4P               |
|         |          |             | D755   | 8-719-301-38   | DIODE SEL2210S-C                |
|         |          |             | D761   | 8-719-301-43   | DIODE SEL2410E-C                |
|         |          |             | D762   | 8-719-300-95   | DIODE SEL2710K                  |
|         |          |             | D763   | 8-719-301-60   | DIODE SEL2910A-C                |
|         |          |             | D764   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D765   | 8-719-301-38   | DIODE SEL2210S-C                |
|         |          |             | D771   | 8-719-301-43   | DIODE SEL2410E-C                |
|         |          |             | D772   | 8-719-300-95   | DIODE SEL2710K                  |
|         |          |             | D773   | 8-719-301-60   | DIODE SEL2910A-C                |
|         |          |             | D774   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D775   | 8-719-301-38   | DIODE SEL2210S-C                |
|         |          |             | D781   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D782   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D783   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D784   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D791   | 8-719-901-62   | DIODE HZ16-2L                   |
|         |          |             | D901   | A-8-719-300-67 | DIODE RB602F                    |
|         |          |             | D902   | A-8-719-300-57 | DIODE RB402                     |
|         |          |             | D904   | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D910   | 8-719-904-21   | DIODE HZ12A1                    |
|         |          |             | D915   | 8-719-904-21   | DIODE HZ12A1                    |
|         |          |             | D920   | 8-719-910-71   | DIODE HZ7A1L                    |
|         |          |             | D1101  | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D1102  | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D1125  | 8-719-910-61   | DIODE HZ6A1L                    |
|         |          |             | D1151  | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D1152  | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D1175  | 8-719-910-61   | DIODE HZ6A1L                    |
|         |          |             | D1231  | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D1232  | 8-719-911-19   | DIODE ISS119                    |
|         |          |             | D1301  | 8-719-403-98   | DIODE LN450YP                   |
|         |          |             | F901   | A-1-532-285-00 | FUSE, TIME-LAG, 1.25A           |
|         |          |             | F902   | A-1-532-285-00 | (EA3,E)...FUSE, TIME-LAG, 1.25A |
|         |          |             | IC101  | 8-759-602-54   | IC CX20106A                     |
|         |          |             | IC101  | 8-759-600-02   | IC M5218L                       |
|         |          |             | IC201  | 8-759-600-02   | IC M5218L                       |
|         |          |             | D711   | 8-719-301-43   | DIODE SEL2410E-C                |
|         |          |             | D712   | 8-719-300-95   | DIODE SEL2710K                  |
|         |          |             | D713   | 8-719-301-60   | DIODE SEL2910A-C                |
|         |          |             | D714   | 8-719-301-52   | DIODE SEL2810A-C                |
|         |          |             | D715   | 8-719-301-38   |                                 |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description |      |    |      |  |  |
|---------|--------------|-------------|------|----|------|--|--|
| R117    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R151    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R152    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R153    | 1-247-873-00 | CARBON      | 56K  | 5% | 1/6W |  |  |
| R154    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R155    | 1-249-437-11 | CARBON      | 47K  | 5% | 1/6W |  |  |
| R156    | 1-247-901-00 | CARBON      | 820K | 5% | 1/6W |  |  |
| R161    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R165    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R166    | 1-247-843-00 | CARBON      | 3.3K | 5% | 1/6W |  |  |
| R167    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R202    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R203    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R204    | 1-247-853-00 | CARBON      | 8.2K | 5% | 1/6W |  |  |
| R205    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R206    | 1-247-849-00 | CARBON      | 5.6K | 5% | 1/6W |  |  |
| R207    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R208    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R209    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R210    | 1-249-434-11 | CARBON      | 27K  | 5% | 1/6W |  |  |
| R211    | 1-247-849-00 | CARBON      | 5.6K | 5% | 1/6W |  |  |
| R212    | 1-247-873-00 | CARBON      | 56K  | 5% | 1/6W |  |  |
| R214    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |  |
| R215    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |  |
| R218    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |  |
| R231    | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |  |  |
| R252    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R253    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R254    | 1-247-853-00 | CARBON      | 8.2K | 5% | 1/6W |  |  |
| R255    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R256    | 1-247-849-00 | CARBON      | 5.6K | 5% | 1/6W |  |  |
| R257    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R258    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R259    | 1-247-891-00 | CARBON      | 330K | 5% | 1/6W |  |  |
| R260    | 1-249-434-11 | CARBON      | 27K  | 5% | 1/6W |  |  |
| R261    | 1-247-849-00 | CARBON      | 5.6K | 5% | 1/6W |  |  |
| R262    | 1-247-873-00 | CARBON      | 56K  | 5% | 1/6W |  |  |
| R264    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |  |
| R265    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |  |
| R268    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |  |
| R281    | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |  |  |
| R305    | 1-247-843-00 | CARBON      | 3.3K | 5% | 1/6W |  |  |
| R306    | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |  |  |
| R307    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R312    | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |  |  |
| R313    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |  |
| R315    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |  |
| R316    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |  |
| R321    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |  |
| R322    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |  |
| R323    | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |  |  |
| R331    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |  |
| R332    | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |  |  |
| R333    | 1-247-843-00 | CARBON      | 3.3K | 5% | 1/6W |  |  |
| R335    | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |  |  |
| R336    | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |  |  |
| R340    | 1-247-843-00 | CARBON      | 3.3K | 5% | 1/6W |  |  |

ELECTRICAL PARTS

| Ref.No. | Part No.      | Description |      |     |      |  |  |
|---------|---------------|-------------|------|-----|------|--|--|
| R341    | 1-247-843-00  | CARBON      | 3.3K | 5%  | 1/6W |  |  |
| R342    | 1-247-843-00  | CARBON      | 3.3K | 5%  | 1/6W |  |  |
| R343    | 1-247-843-00  | CARBON      | 3.3K | 5%  | 1/6W |  |  |
| R345    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R346    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R347    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R348    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R350    | 1-249-441-11  | CARBON      | 100K | 5%  | 1/6W |  |  |
| R351    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R352    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R353    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R354    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R355    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R356    | 1-249-441-11  | CARBON      | 100K | 5%  | 1/6W |  |  |
| R357    | 1-247-891-00  | CARBON      | 330K | 5%  | 1/6W |  |  |
| R358    | 1-249-441-11  | CARBON      | 100K | 5%  | 1/6W |  |  |
| R361    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R362    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R363    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R371    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R372    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R373    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R380    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R381    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R382    | 1-247-873-00  | CARBON      | 56K  | 5%  | 1/6W |  |  |
| R385    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R386    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R391    | 1-249-414-11  | CARBON      | 560  | 5%  | 1/6W |  |  |
| R392    | 1-249-414-11  | CARBON      | 560  | 5%  | 1/6W |  |  |
| R394    | 1-247-831-00  | CARBON      | 1K   | 5%  | 1/6W |  |  |
| R395    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R396    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R397    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R398    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R399    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R411    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R412    | 1-249-437-11  | CARBON      | 47K  | 5%  | 1/6W |  |  |
| R413    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R421    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R422    | 1-249-437-11  | CARBON      | 47K  | 5%  | 1/6W |  |  |
| R423    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R461    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R491    | 1-247-823-00  | CARBON      | 470  | 5%  | 1/6W |  |  |
| R501    | 1-249-429-11  | CARBON      | 10K  | 5%  | 1/6W |  |  |
| R502    | 1-249-414-11  | CARBON      | 560  | 5%  | 1/6W |  |  |
| R503    | 1-249-432-11  | CARBON      | 18K  | 5%  | 1/6W |  |  |
| R504    | 1-249-440-11  | CARBON      | 82K  | 5%  | 1/6W |  |  |
| R505    | 1-249-425-11  | CARBON      | 4.7K | 5%  | 1/6W |  |  |
| R506    | 1-247-831-00  | CARBON      | 1K   | 5%  | 1/6W |  |  |
| R601    | 1-247-873-00  | CARBON      | 56K  | 5%  | 1/6W |  |  |
| R602    | 1-249-421-11  | CARBON      | 2.2K | 5%  | 1/6W |  |  |
| R603    | 1-249-421-11  | CARBON      | 2.2K | 5%  | 1/6W |  |  |
| R604    | 1-247-873-00  | CARBON      | 56K  | 5%  | 1/6W |  |  |
| R605    | ▲1-247-717-11 | CARBON      | 2.2K | 5%  | 1/4W |  |  |
| R606    | ▲1-247-717-11 | CARBON      | 2.2K | 5%  | 1/4W |  |  |
| R607    | ▲1-217-151-00 | METAL PLATE | 0.22 | 10% | 2W   |  |  |
| R608    | 1-249-414-11  | CARBON      | 560  | 5%  | 1/6W |  |  |

The components identified by shading and mark  are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

| Ref.No.       | Part No.     | Description | Value | Tolerance | Power  |
|---------------|--------------|-------------|-------|-----------|--------|
| R609          | 1-249-414-11 | CARBON      | 560   | 5%        | 1/6W   |
| R611 $\Delta$ | 1-247-192-00 | CARBON      | 10    | 5%        | 1/2W F |
| R631 $\Delta$ | 1-217-399-00 | FUSIBLE     | 100   | 5%        | 1/4W F |
| R632 $\Delta$ | 1-247-240-00 | CARBON      | 1K    | 5%        | 1/2W F |
| R633 $\Delta$ | 1-247-240-00 | CARBON      | 1K    | 5%        | 1/2W F |
| R634 $\Delta$ | 1-212-883-00 | FUSIBLE     | 120   | 5%        | 1/4W F |
| R635 $\Delta$ | 1-217-399-00 | FUSIBLE     | 100   | 5%        | 1/4W F |
| R641          | 1-247-849-00 | CARBON      | 5.6K  | 5%        | 1/6W   |
| R651          | 1-247-873-00 | CARBON      | 56K   | 5%        | 1/6W   |
| R652          | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W   |
| R653          | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W   |
| R654          | 1-247-873-00 | CARBON      | 56K   | 5%        | 1/6W   |
| R655 $\Delta$ | 1-247-717-11 | CARBON      | 2.2K  | 5%        | 1/4W   |
| R656 $\Delta$ | 1-247-717-11 | CARBON      | 2.2K  | 5%        | 1/4W   |
| R657 $\Delta$ | 1-217-151-00 | METAL PLATE | 0.22  | 10%       | 2W     |
| R658          | 1-249-414-11 | CARBON      | 560   | 5%        | 1/6W   |
| R659          | 1-249-414-11 | CARBON      | 560   | 5%        | 1/6W   |
| R661 $\Delta$ | 1-247-192-00 | CARBON      | 10    | 5%        | 1/2W F |
| R671          | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W   |
| R672          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R673          | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W   |
| R674          | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W   |
| R675          | 1-247-881-00 | CARBON      | 120K  | 5%        | 1/6W   |
| R676          | 1-247-881-00 | CARBON      | 120K  | 5%        | 1/6W   |
| R677          | 1-249-441-11 | CARBON      | 100K  | 5%        | 1/6W   |
| R678 $\Delta$ | 1-247-220-00 | CARBON      | 150   | 5%        | 1/2W F |
| R679          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R680          | 1-247-873-00 | CARBON      | 56K   | 5%        | 1/6W   |
| R691          | 1-247-849-00 | CARBON      | 5.6K  | 5%        | 1/6W   |
| R701          | 1-249-414-11 | CARBON      | 560   | 5%        | 1/6W   |
| R702          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R703          | 1-249-435-11 | CARBON      | 33K   | 5%        | 1/6W   |
| R704          | 1-247-833-00 | CARBON      | 1.2K  | 5%        | 1/6W   |
| R705          | 1-249-419-11 | CARBON      | 1.5K  | 5%        | 1/6W   |
| R711          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R712          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R716          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R721          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R722          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R726          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R731          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R732          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R736          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R741          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R742          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R746          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R751          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R752          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R756          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R761          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R762          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R766          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R771          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R772          | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R776          | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R781          | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |
| R782          | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |

ELECTRICAL PARTS

| Ref.No.       | Part No.     | Description | Value | Tolerance | Power  |
|---------------|--------------|-------------|-------|-----------|--------|
| R783          | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |
| R784          | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |
| R785          | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |
| R786          | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |
| R787          | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W   |
| R791          | 1-247-719-11 | CARBON      | 3.3K  | 5%        | 1/4W   |
| R792          | 1-247-719-11 | CARBON      | 3.3K  | 5%        | 1/4W   |
| R793          | 1-249-414-11 | CARBON      | 560   | 5%        | 1/6W   |
| R796          | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W   |
| R797          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R798          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R799          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R801 $\Delta$ | 1-247-711-11 | CARBON      | 680   | 5%        | 1/4W F |
| R802 $\Delta$ | 1-247-711-11 | CARBON      | 680   | 5%        | 1/4W F |
| R903 $\Delta$ | 1-217-422-00 | FUSIBLE     | 1     | 5%        | 1/2W F |
| R904          | 1-247-849-00 | CARBON      | 5.6K  | 5%        | 1/6W   |
| R905 $\Delta$ | 1-217-422-00 | FUSIBLE     | 1     | 5%        | 1/2W F |
| R906 $\Delta$ | 1-217-482-00 | FUSIBLE     | 12    | 5%        | 1W F   |
| R910 $\Delta$ | 1-207-934-00 | WIREWOUND   | 120   | 10%       | 5W F   |
| R911          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R912          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R915 $\Delta$ | 1-207-686-00 | WIREWOUND   | 100   | 10%       | 5W F   |
| R916          | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R917          | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R920 $\Delta$ | 1-213-131-00 | METAL OXIDE | 100   | 5%        | 1W F   |
| R921          | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W   |
| R1101         | 1-247-895-00 | CARBON      | 470K  | 5%        | 1/6W   |
| R1102         | 1-247-887-00 | CARBON      | 220K  | 5%        | 1/6W   |
| R1103         | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W   |
| R1104         | 1-247-815-00 | CARBON      | 220   | 5%        | 1/6W   |
| R1105         | 1-249-440-11 | CARBON      | 82K   | 5%        | 1/6W   |
| R1106         | 1-247-857-00 | CARBON      | 12K   | 5%        | 1/6W   |
| R1107         | 1-247-851-00 | CARBON      | 6.8K  | 5%        | 1/6W   |
| R1108         | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W   |
| R1109         | 1-247-869-00 | CARBON      | 39K   | 5%        | 1/6W   |
| R1110         | 1-247-845-00 | CARBON      | 3.9K  | 5%        | 1/6W   |
| R1111         | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W   |
| R1112         | 1-247-833-00 | CARBON      | 1.2K  | 5%        | 1/6W   |
| R1113         | 1-247-895-00 | CARBON      | 470K  | 5%        | 1/6W   |
| R1114         | 1-247-903-00 | CARBON      | 1M    | 5%        | 1/6W   |
| R1115         | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W   |
| R1116         | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W   |
| R1117         | 1-247-815-00 | CARBON      | 220   | 5%        | 1/6W   |
| R1118         | 1-247-851-00 | CARBON      | 6.8K  | 5%        | 1/6W   |
| R1119         | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W   |
| R1121         | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W   |
| R1125         | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W   |
| R1126         | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W   |
| R1127         | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W   |
| R1128         | 1-249-405-11 | CARBON      | 100   | 5%        | 1/6W   |
| R1129         | 1-249-435-11 | CARBON      | 33K   | 5%        | 1/6W   |
| R1131         | 1-249-435-11 | CARBON      | 33K   | 5%        | 1/6W   |
| R1132         | 1-247-813-00 | CARBON      | 180   | 5%        | 1/6W   |
| R1133         | 1-247-706-11 | CARBON      | 330   | 5%        | 1/4W   |
| R1134         | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W   |
| R1135         | 1-247-815-00 | CARBON      | 220   | 5%        | 1/6W   |
| R1136         | 1-247-809-00 | CARBON      | 120   | 5%        | 1/6W   |

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

**ELECTRICAL PARTS**

| Ref.No. | Part No.     | Description | 1M   | 5% | 1/6W |
|---------|--------------|-------------|------|----|------|
| R1137   | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |
| R1138   | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |
| R1148   | 1-249-441-11 | CARBON      | 100K | 5% | 1/6W |
| R1149   | 1-249-405-11 | CARBON      | 100  | 5% | 1/6W |
| R1151   | 1-247-895-00 | CARBON      | 470K | 5% | 1/6W |
| R1152   | 1-247-887-00 | CARBON      | 220K | 5% | 1/6W |
| R1153   | 1-249-425-11 | CARBON      | 4.7K | 5% | 1/6W |
| R1154   | 1-247-815-00 | CARBON      | 220  | 5% | 1/6W |
| R1155   | 1-249-440-11 | CARBON      | 82K  | 5% | 1/6W |
| R1156   | 1-247-857-00 | CARBON      | 12K  | 5% | 1/6W |
| R1157   | 1-247-851-00 | CARBON      | 6.8K | 5% | 1/6W |
| R1158   | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |
| R1159   | 1-247-869-00 | CARBON      | 39K  | 5% | 1/6W |
| R1160   | 1-247-845-00 | CARBON      | 3.9K | 5% | 1/6W |
| R1161   | 1-247-875-00 | CARBON      | 68K  | 5% | 1/6W |
| R1162   | 1-247-833-00 | CARBON      | 1.2K | 5% | 1/6W |
| R1163   | 1-247-895-00 | CARBON      | 470K | 5% | 1/6W |
| R1164   | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |
| R1165   | 1-247-841-00 | CARBON      | 2.7K | 5% | 1/6W |
| R1166   | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |
| R1167   | 1-247-815-00 | CARBON      | 220  | 5% | 1/6W |
| R1168   | 1-247-851-00 | CARBON      | 6.8K | 5% | 1/6W |
| R1169   | 1-249-421-11 | CARBON      | 2.2K | 5% | 1/6W |
| R1171   | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |
| R1175   | 1-247-819-00 | CARBON      | 330  | 5% | 1/6W |
| R1176   | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |
| R1177   | 1-249-429-11 | CARBON      | 10K  | 5% | 1/6W |
| R1178   | 1-249-405-11 | CARBON      | 100  | 5% | 1/6W |
| R1179   | 1-249-435-11 | CARBON      | 33K  | 5% | 1/6W |
| R1181   | 1-249-435-11 | CARBON      | 33K  | 5% | 1/6W |
| R1182   | 1-247-813-00 | CARBON      | 180  | 5% | 1/6W |
| R1183   | 1-247-706-11 | CARBON      | 330  | 5% | 1/4W |
| R1184   | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |
| R1185   | 1-247-815-00 | CARBON      | 220  | 5% | 1/6W |
| R1186   | 1-247-809-00 | CARBON      | 120  | 5% | 1/6W |
| R1187   | 1-247-903-00 | CARBON      | 1M   | 5% | 1/6W |
| R1188   | 1-247-831-00 | CARBON      | 1K   | 5% | 1/6W |
| R1199   | 1-249-405-11 | CARBON      | 100  | 5% | 1/6W |
| R1231   | 1-247-833-00 | CARBON      | 1.2K | 5% | 1/6W |
| R1232   | 1-247-815-00 | CARBON      | 220  | 5% | 1/6W |
| R1233   | 1-247-815-00 | CARBON      | 220  | 5% | 1/6W |
| R1235   | 1-249-433-11 | CARBON      | 22K  | 5% | 1/6W |

**ELECTRICAL PARTS**

| Ref.No.  | Part No.     | Description  | 22K | 5% | 1/6W |
|--|--------------|--|-----|----|------|
| R1236  | 1-249-433-11 | CARBON   | 22K | 5% | 1/6W |
| R1237  | 1-249-433-11 | CARBON   | 22K | 5% | 1/6W |
| R1238  | 1-249-429-11 | CARBON   | 10K | 5% | 1/6W |
| R1239  | 1-249-433-11 | CARBON   | 22K | 5% | 1/6W |
| R1241  | 1-247-831-00 | CARBON   | 1K  | 5% | 1/6W |
| R1245  | 1-247-831-00 | CARBON   | 1K  | 5% | 1/6W |
| R1246  | 1-247-831-00 | CARBON   | 1K  | 5% | 1/6W |
| R1247  | 1-247-831-00 | CARBON   | 1K  | 5% | 1/6W |
| R1501  | 1-247-688-11 | (G-AEP)...CARBON                                       | 10  | 5% | 1/4W |
| R1502  | 1-247-688-11 | (G-AEP)...CARBON                                       | 10  | 5% | 1/4W |
| RV401  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (BALANCE),<br>including D401 |     |    |      |
| RV402  | 1-237-243-31 | RES, VAR, SLIDE 50K/50K (MIC LEVEL),<br>including D402 |     |    |      |
| RV411  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (63Hz),<br>including D411    |     |    |      |
| RV412  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (150Hz),<br>including D412   |     |    |      |
| RV413  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (400Hz),<br>including D413   |     |    |      |
| RV414  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (1kHz),<br>including D414    |     |    |      |
| RV415  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (3kHz),<br>including D415    |     |    |      |
| RV416  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (6kHz),<br>including D416    |     |    |      |
| RV417  | 1-230-813-31 | RES, VAR, SLIDE 250K/250K (14kHz),<br>including D417   |     |    |      |
| RY601  | 1-515-503-00 | RELAY  |     |    |      |
| SW701  | 1-554-303-21 | SWITCH, KEY BOARD (VOLUME UP)                          |     |    |      |
| SW702  | 1-554-303-21 | SWITCH, KEY BOARD (VOLUME DOWN)                        |     |    |      |
| SW703  | 1-554-303-21 | SWITCH, KEY BOARD (MUTING-20dB)                        |     |    |      |
| SW704  | 1-554-303-21 | SWITCH, KEY BOARD (PHONO)                              |     |    |      |
| SW705  | 1-554-303-21 | SWITCH, KEY BOARD (TVNER)                              |     |    |      |
| SW706  | 1-554-303-21 | SWITCH, KEY BOARD (CD/AUX)                             |     |    |      |
| SW707  | 1-554-303-21 | SWITCH, KEY BOARD (TAPE)                               |     |    |      |
| <b>ASW1001.1-553-318-51</b> SWITCH, PUSH (AC POWER)(1 KEY), POWER  |              |  |     |    |      |
| <b>ASW1002.1-526-576-51</b> (EA3,E)...SELECTOR, POWER VOLTAGE      |              |  |     |    |      |
| SW1201 1-554-419-00 SWITCH, PUSH (1 KEY)(AMFB)                     |              |  |     |    |      |
| <b>T1001A.1-448-133-11</b> (EA3,E)...TRANSFORMER, POWER            |              |  |     |    |      |
| <b>T1001A.1-448-134-11</b> (G-AEP,AEP,UK,AED)...TRANSFORMER, POWER |              |  |     |    |      |

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

**FH-150R**  
**TC-177R**

# **STEREO CASSETTE DECK**

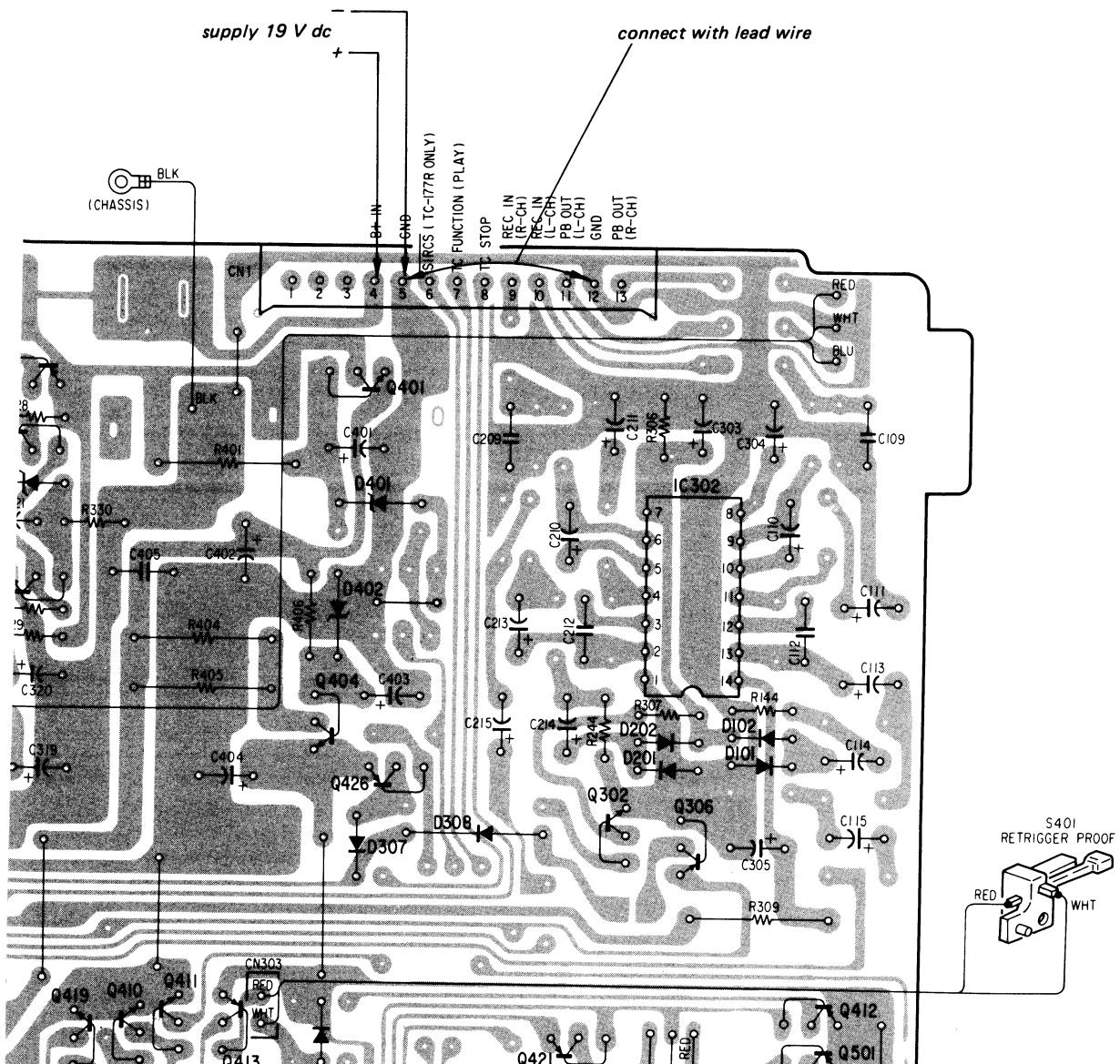
## **(TC-177R)**

---

|                               |            |
|-------------------------------|------------|
| Tape Transport Mechanism Type | TCM-150R10 |
|-------------------------------|------------|

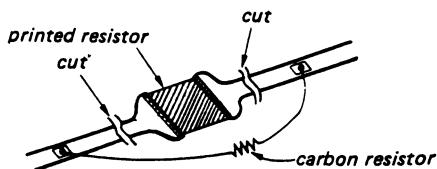
## SERVICING NOTE

- Voltage measurement should be made under the following condition.



- Repairing printed resistor

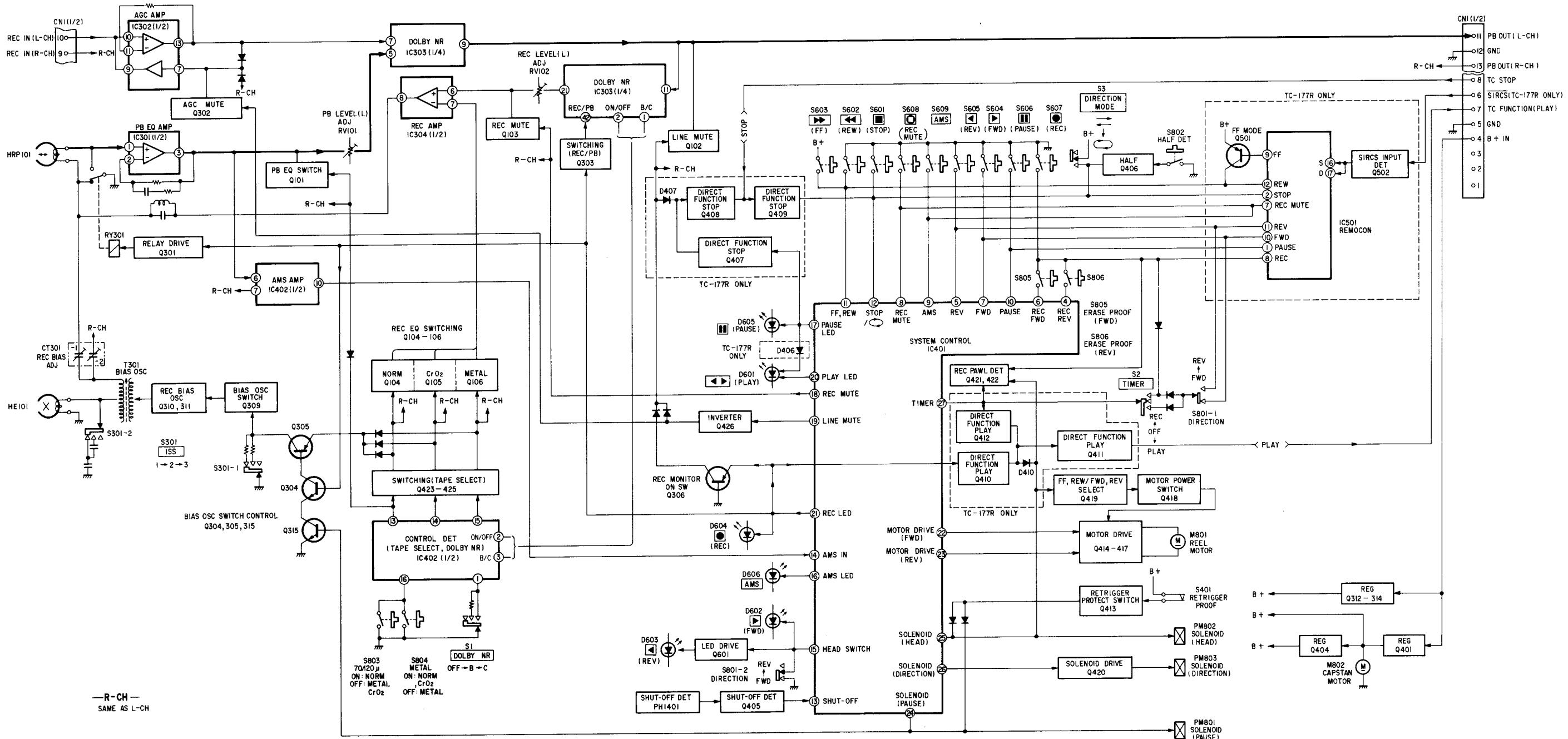
**Cut both sides of the resistor and solder the carbon resistor having same value in place of printed one on the conductor side.**



SECTION 1  
BLOCK DIAGRAM

FH-150R  
TC-177R

FH-150R  
TC-177R



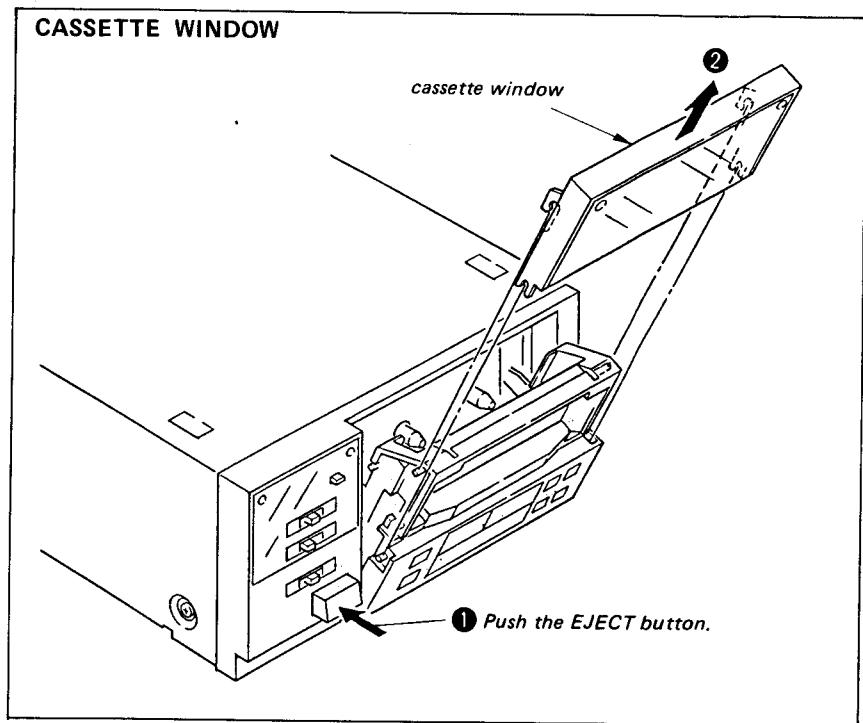
**SECTION 2**  
**DISASSEMBLY**

**FH-150R      FH-150R**  
**TC-177R      TC-177R**

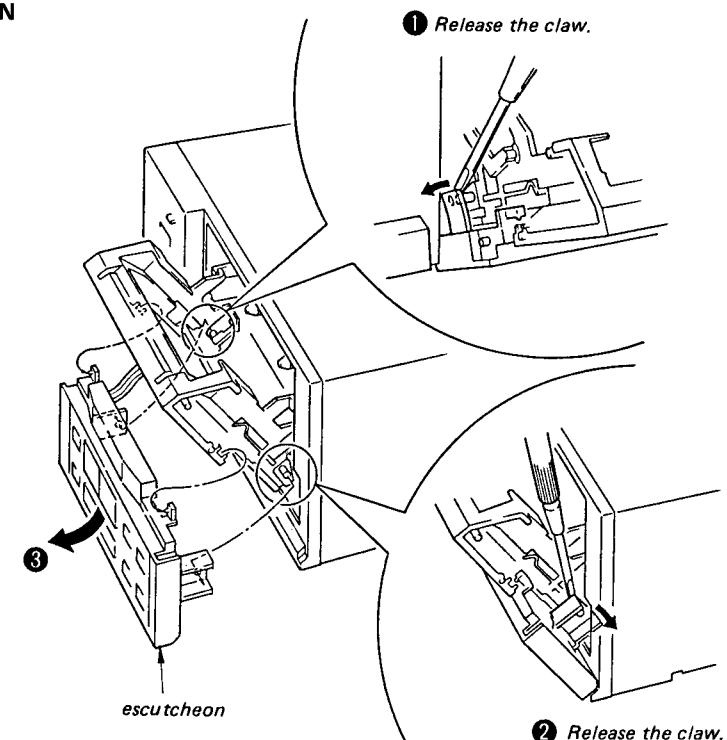
**Note:** Follow the disassembly procedure in the numerical order given.

**CASE REMOVAL**

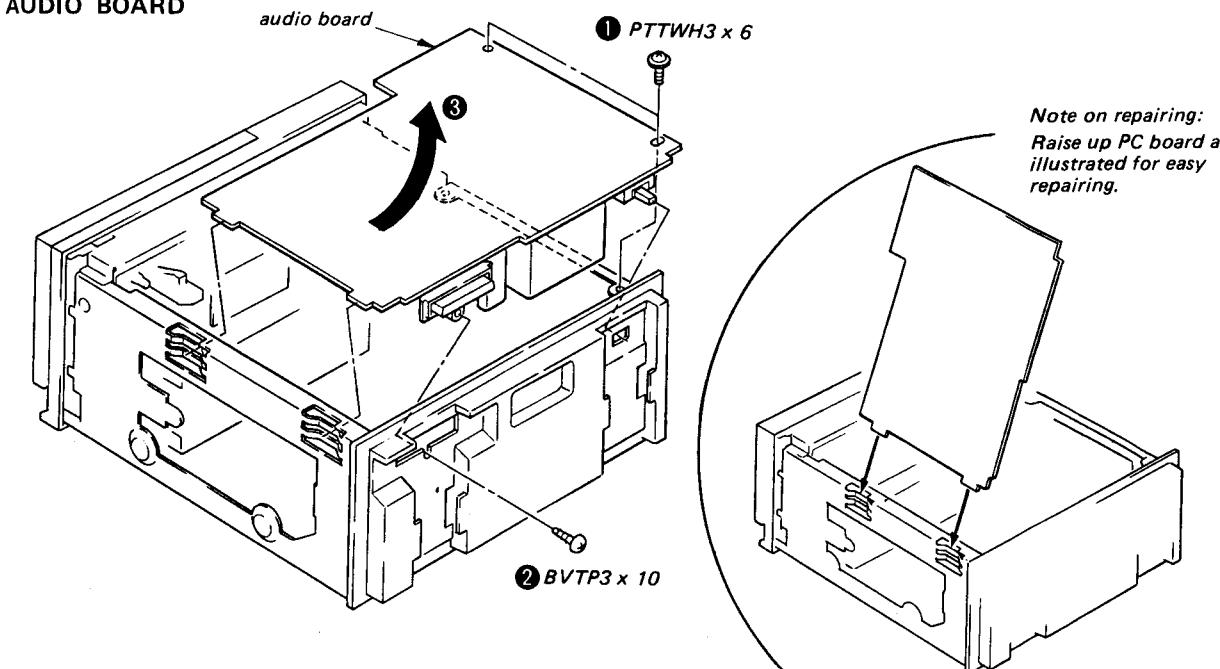
Remove case by taking out four screws securing case.



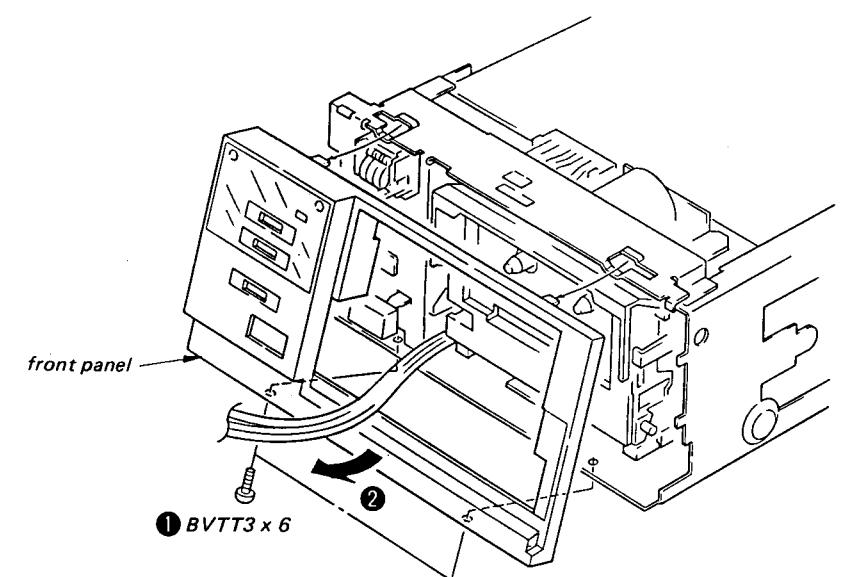
**ESCUTCHEON**

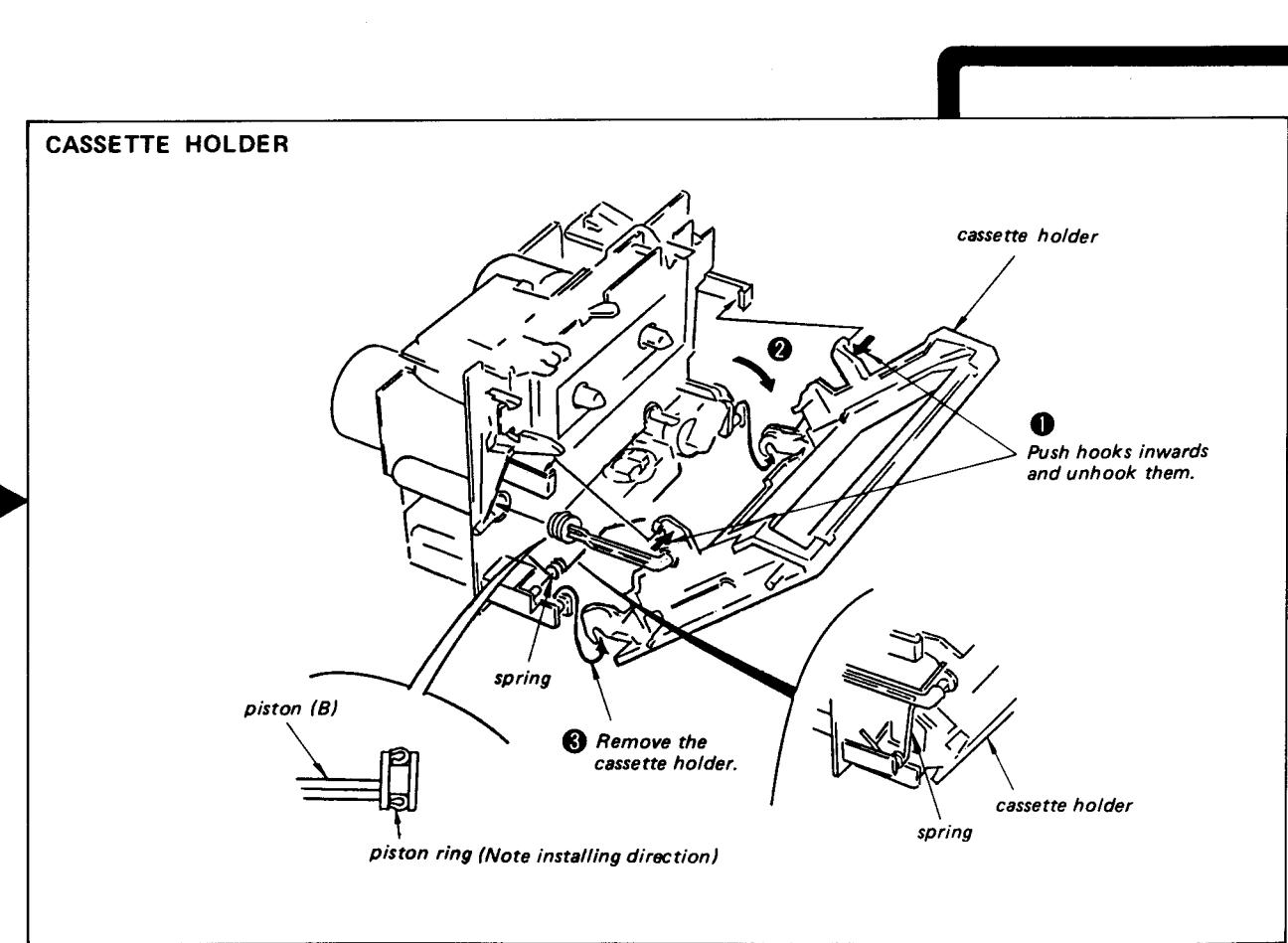
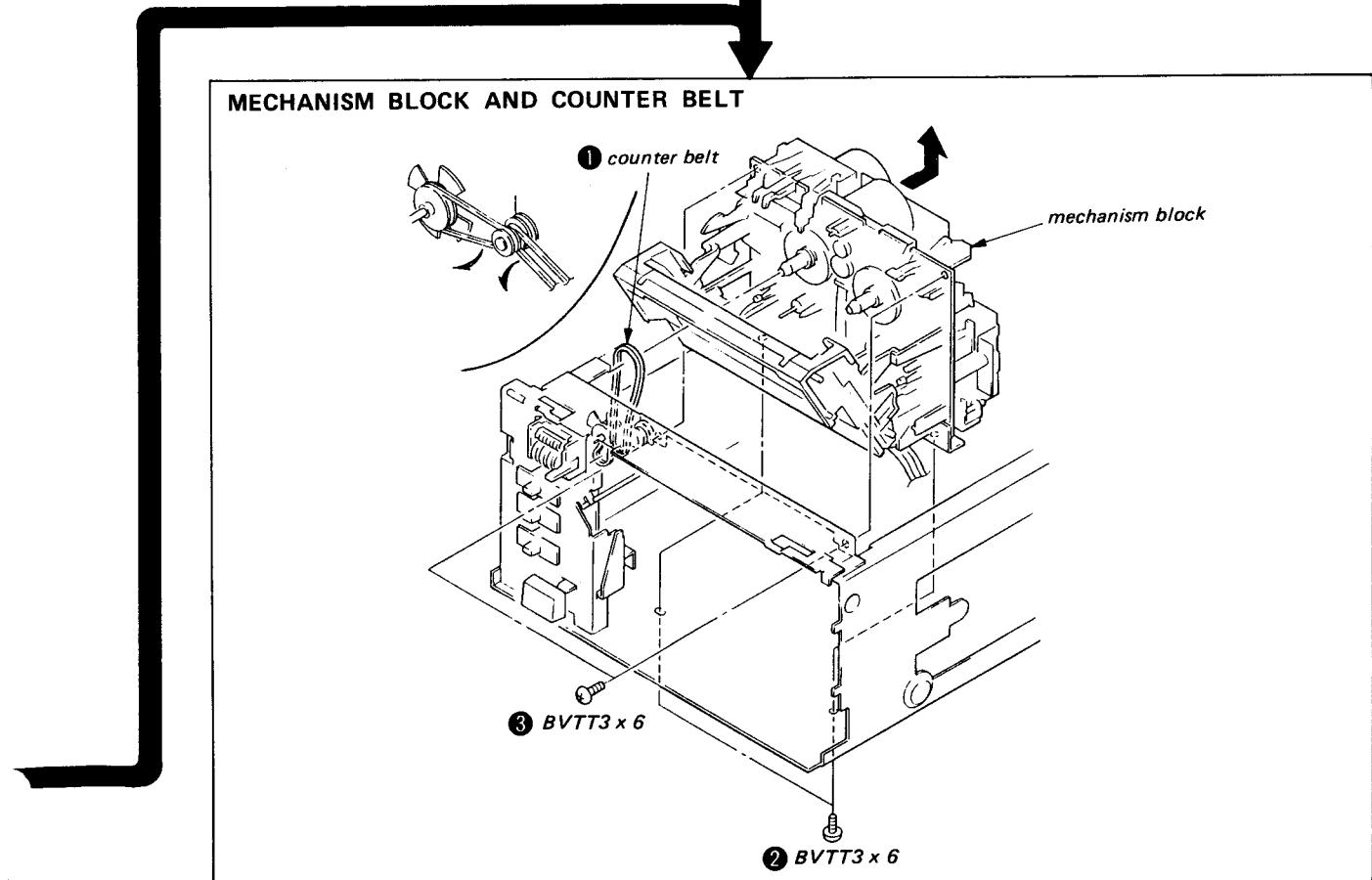
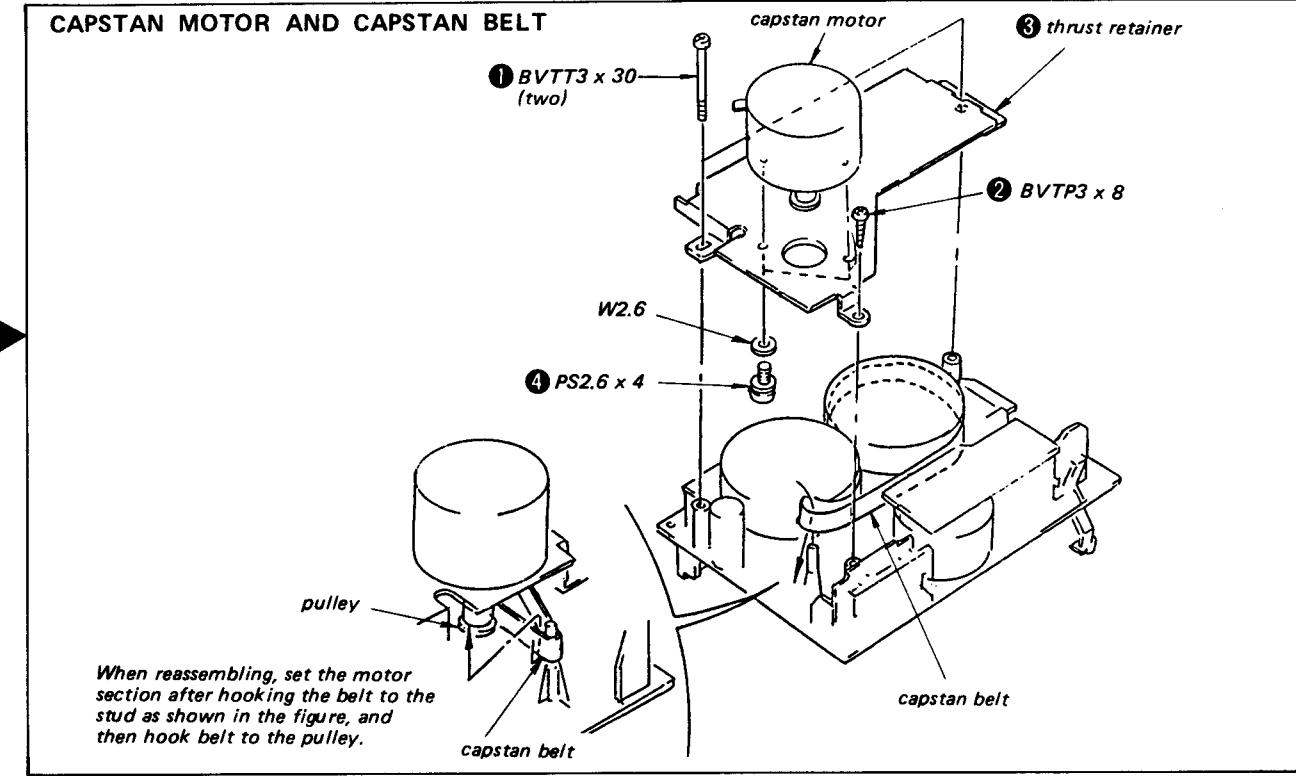
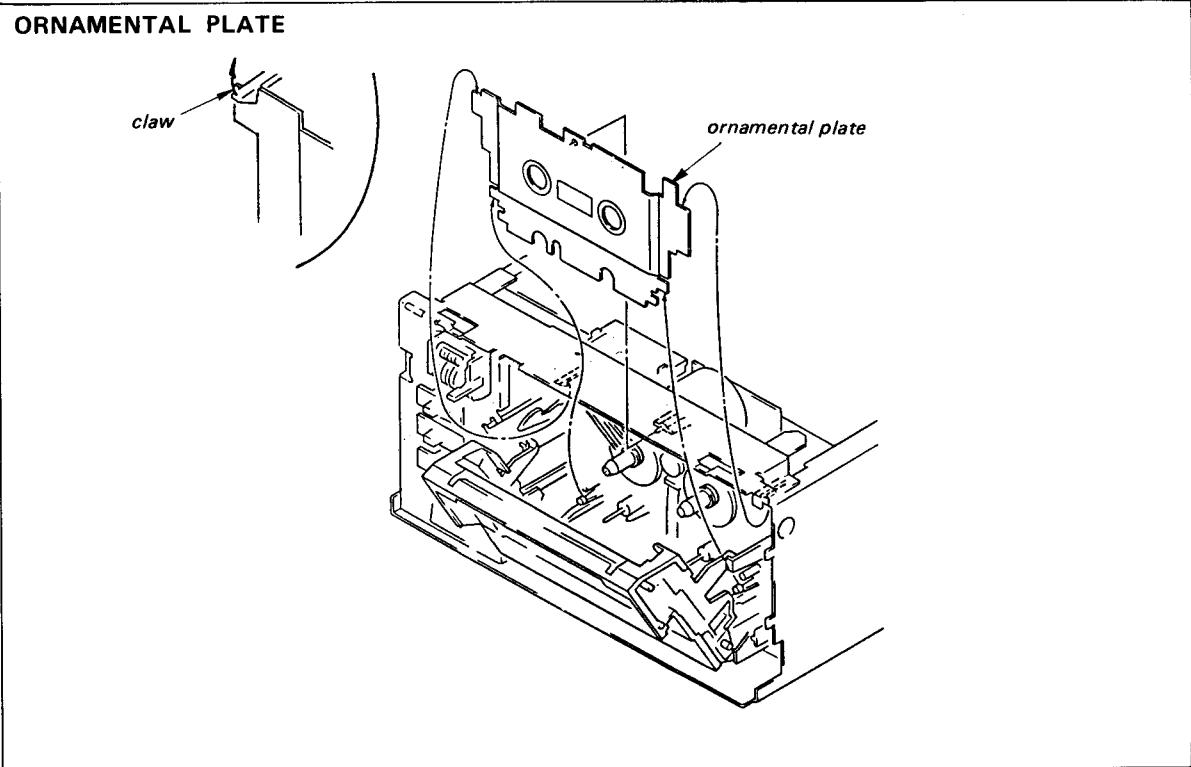


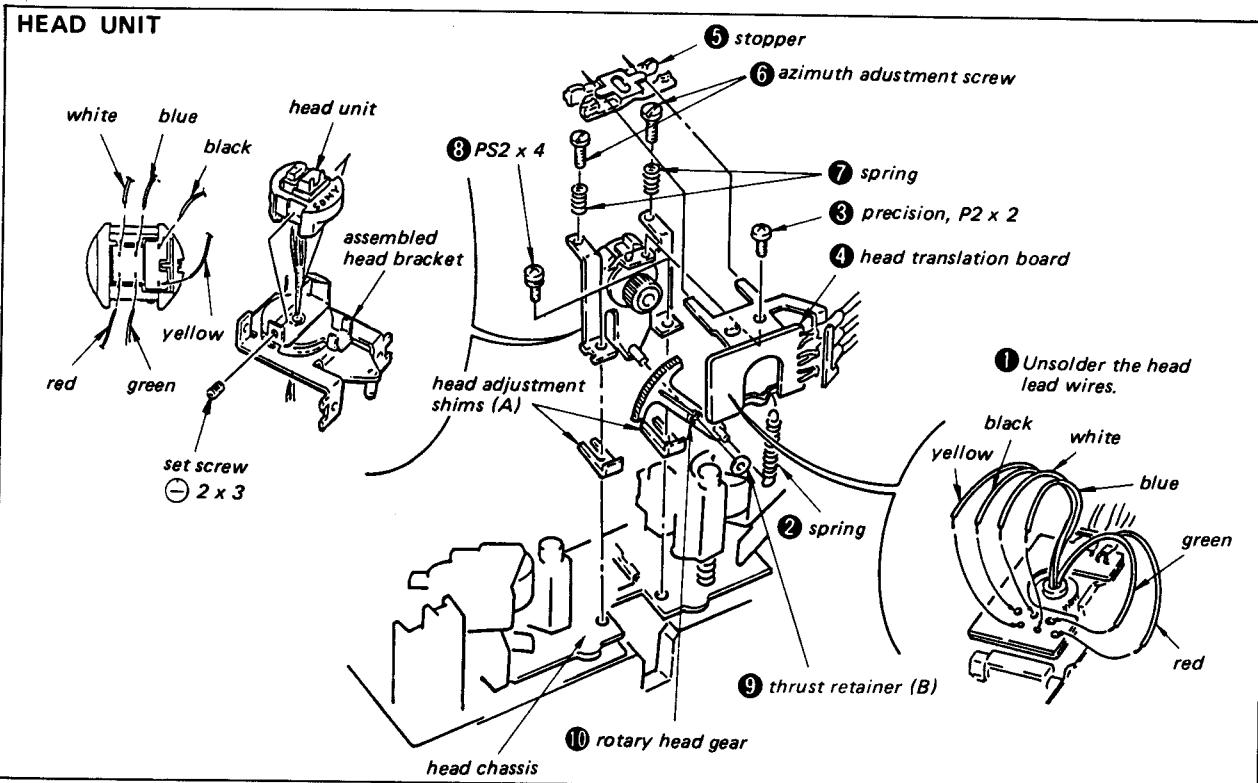
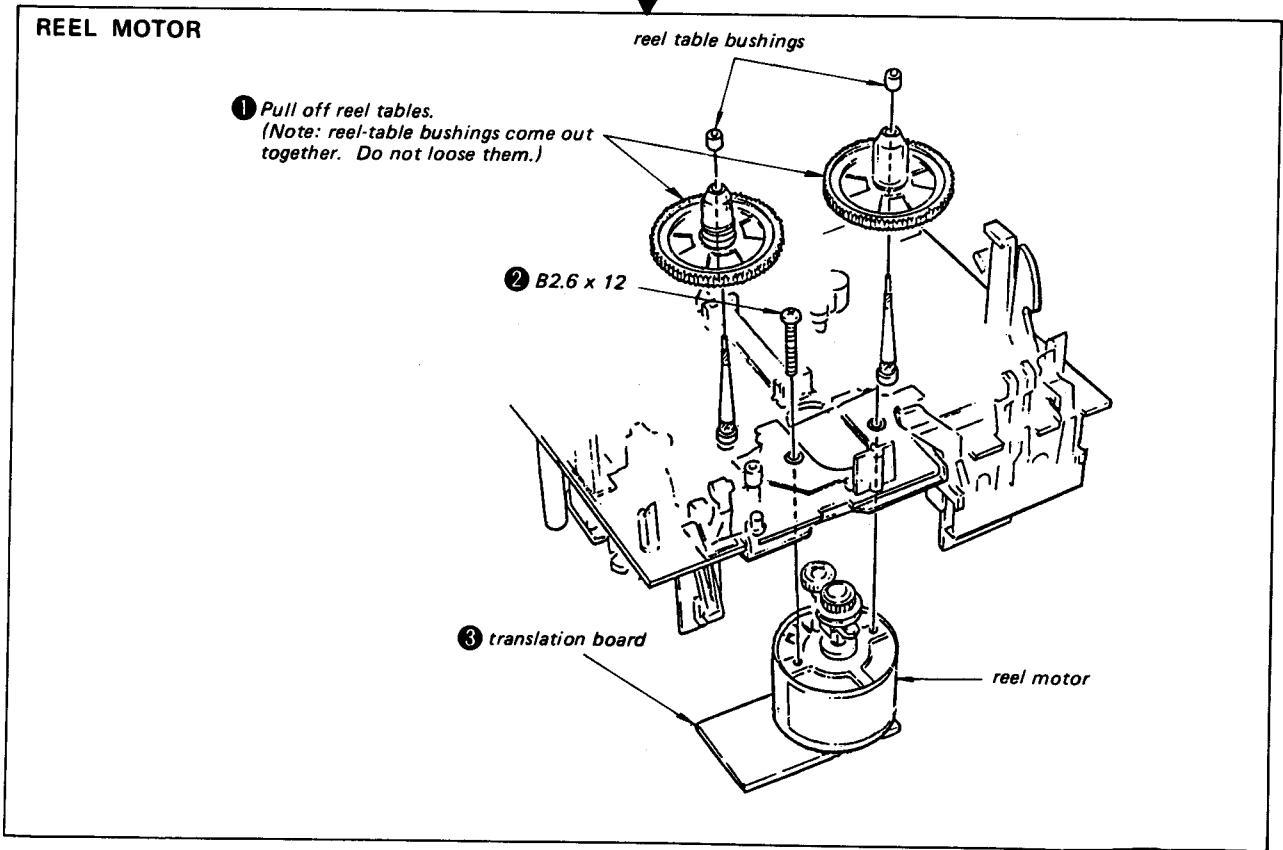
**AUDIO BOARD**



**FRONT PANEL**





**MEMO**

## SECTION 3 ADJUSTMENTS

**FH-150R  
TC-177R**

**FH-150R  
TC-177R**

### 3-1. MECHANICAL ADJUSTMENTS

#### PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:  
record/playback/erase head rubber belts  
capstan  
pinch roller
2. Demagnetize the head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

#### Torque Measurement

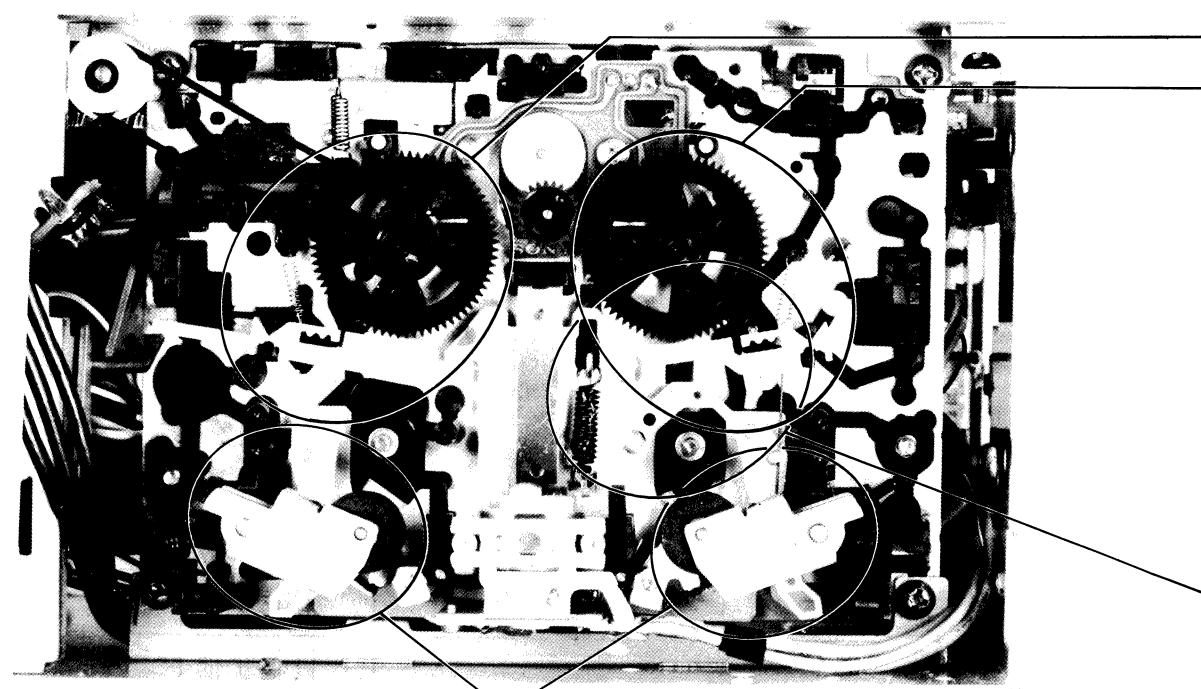
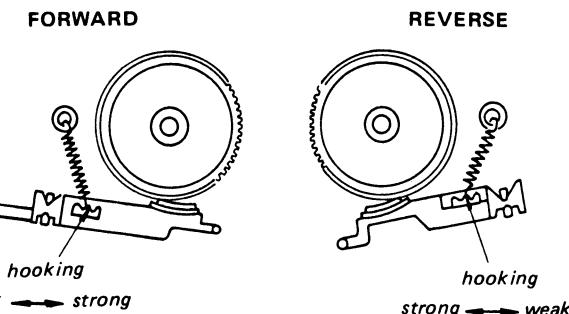
| Torque                  | Torque meter | Meter reading                           |
|-------------------------|--------------|---|
| Forward                 | CQ-102C      | 28 – 60 g·cm<br>(0.39 – 0.82 oz·inch)   |
| Reverse                 | CQ-102RB     |   |
| Fast Forward and Rewind | CQ-201B      | 80 – 150 g·cm<br>(1.1 – 2.07 oz·inch)   |
| Forward Back Tension    | CQ-102C      | 2.5 – 5.5 g·cm<br>(0.03 – 0.07 oz·inch) |
| Reverse Back Tension    | CQ-102RB     | 2.5 – 7 g·cm<br>(0.03 – 0.09 oz·inch)   |

#### BACK TENSION ADJUSTMENT

##### — Forward and Reverse Playback Modes —

Forward: Torque Meter CQ-102C, Torque 2.5 – 5.5 g·cm  
(0.03 – 0.07 oz·inch)

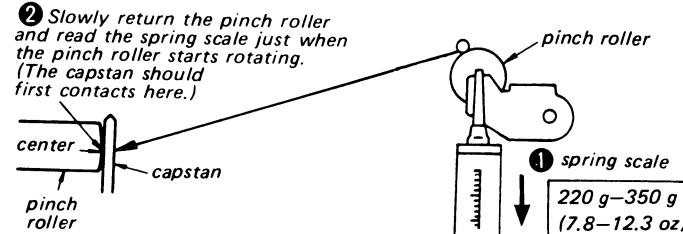
Reverse : Torque Meter CQ-102RB, Torque 2.5 – 7 g·cm  
(0.03 – 0.09 oz·inch)



#### Pinch Roller Pressure Measurement

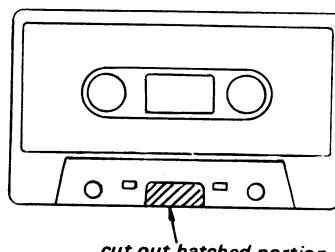
##### — Playback Mode —

② Slowly return the pinch roller and read the spring scale just when the pinch roller starts rotating.  
(The capstan should first contacts here.)

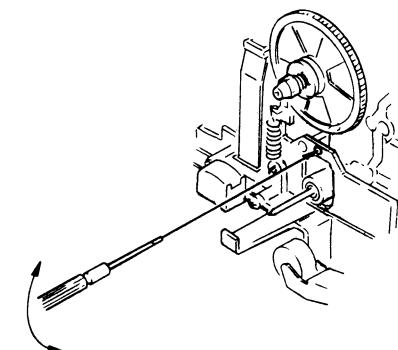


#### Head Position Adjustment in AMS mode

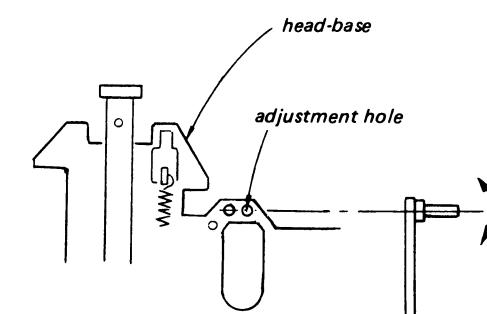
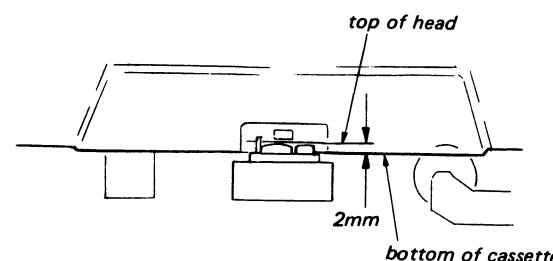
1. Prepare an adjustment cassette as shown below.



If it is not, insert a small screwdriver to the adjustment hole and adjust the head position by bending a head-base so that the distance between top of head and bottom of cassette is 2 mm±0.1 mm.



2. In AMS mode, confirm that the the distance between top of head and bottom of cassette is 2 mm ±0.1 mm (3/32 inch).



#### Precaution on Replacing

As the head center adjustment and the tape path adjustment are affected each other, do not perform them at the same time.

**Note:** When the record/playback/erase head is replaced, be sure to perform the preliminary adjustment first.

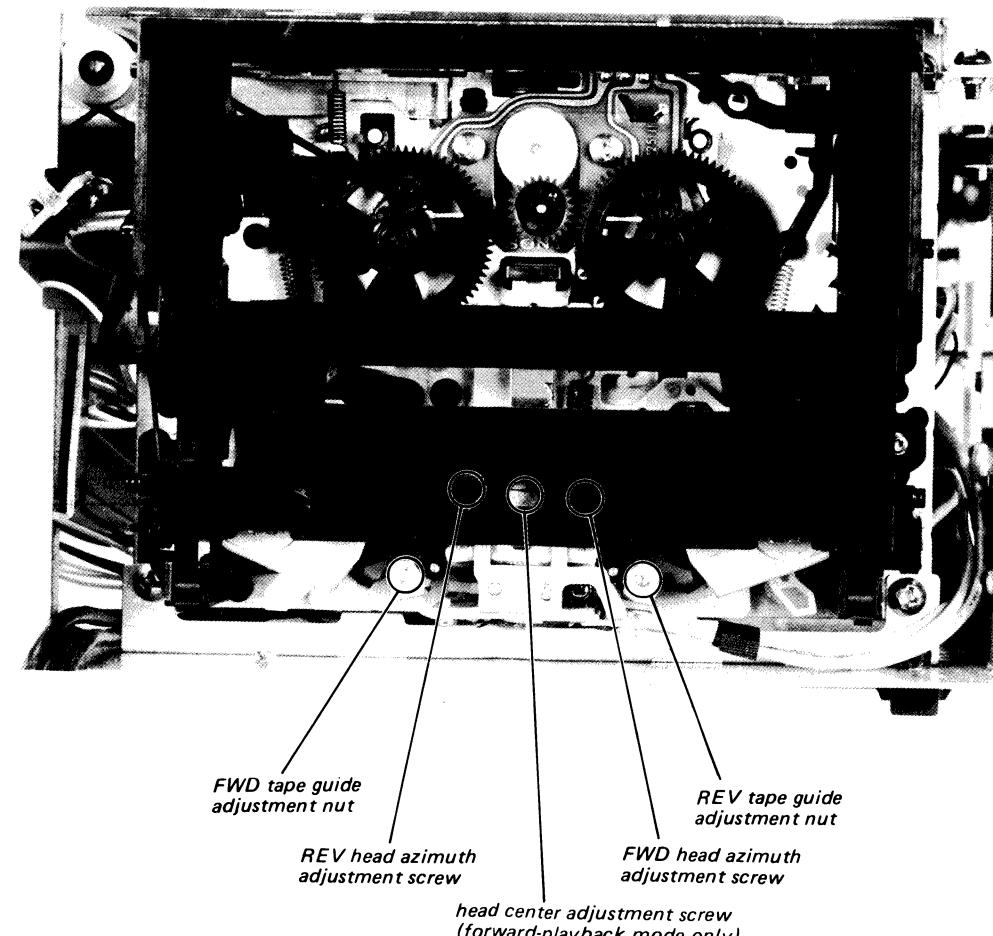
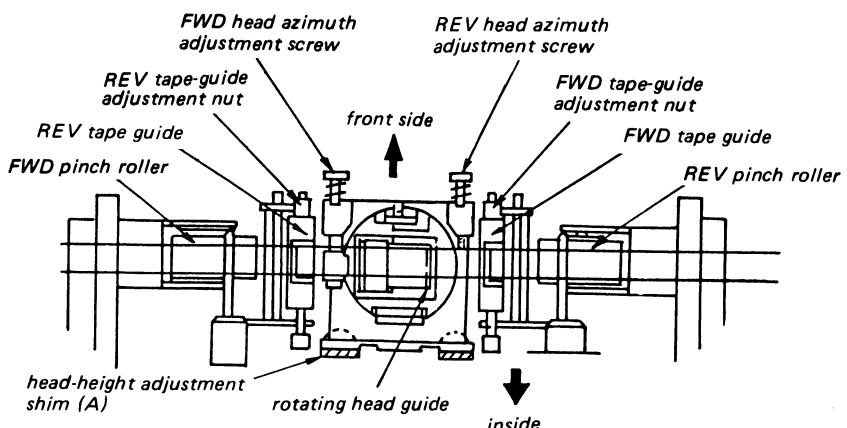
#### Head Center Adjustment

1. Insert a mirror tape cassette, CQ-009C or CQ-012C.
2. Place the unit in forward playback mode.
3. When the lower part of the tape is warped, loosen the head center adjustment screw. (Loosen the screw within one turn.)
4. Place the unit in reverse-playback mode.
5. When the upper part of the tape is warped, secure the adjustment screw. (Secure the screw within one turn.)
6. Repeat steps 2 to 5 several times until there is no warp both in forward and reverse mode.
7. If the warp is not disappeared, repeat steps 2 to 6 after adding or removing the head height adjustment shim (A).
8. After adjustment, lock the head center adjustment screw with locking compound.

#### Tape Path Adjustment

1. Clean the pinch roller and the record/playback/erase head with soft cloth moistened with alcohol.
2. Mode: playback  
Refer to step 1 of the Record/playback Head Azimuth Adjustment on page TC-16 for the setup.
3. Adjust the FWD azimuth adjustment screw in the forward-playback mode and the REV azimuth adjustment screw in the reverse-playback mode so that the oscilloscope reads the maximum output and lissajous figure is in 30 angle reading on the oscilloscope across the LINE OUT.
4. Adjust the FWD tape-guide nut in the foward-playback mode and the REV tape-guide nut in the reverse-playback mode for an in-phase lissajous pattern.  
The turning amount of the nuts should be within 3/4 turns.
5. Repeat steps 3 and 4 severral times until no improvement is obtained.
6. Play a mirror tape cassette in the forward-playback mode.
7. Confirm there is no tape curl at the tape guide.

**Note:** After these adjustments, be sure to perform the Record/playback Head Azimuth Adjustment on page TC-16.

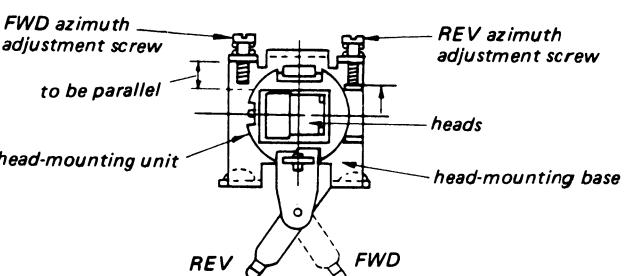


#### HEAD UNIT ADJUSTMENT WHEN REPLACED

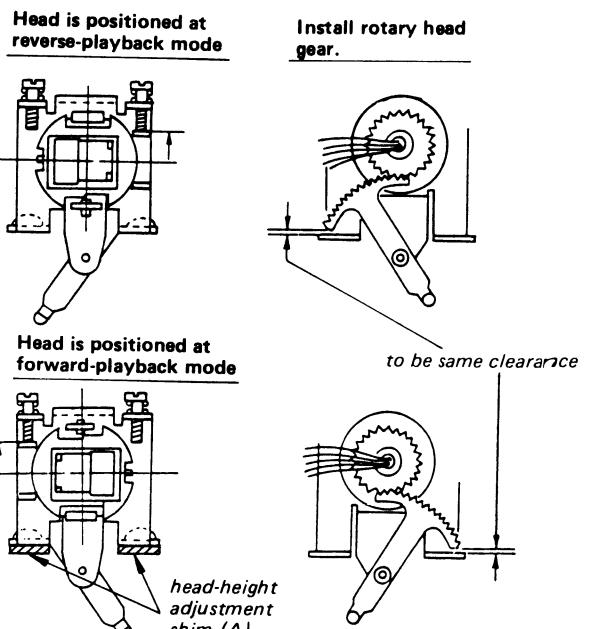
Perform the following preliminary adjustments before proceeding to the Head Center and Tape Path Adjustments.

#### Preliminary Adjustment

1. Install head-mounting unit on the head-mounting base by threading head lead wires through the round hole in the head-mounting base. Also refer to page TC-9.
2. By adjusting both head-azimuth adjustment screws in both forward-playback and reverse-playback mode head positions, align the head-compartment edge line in parallel with the edge line of the head-mounting unit at the azimuth adjustment screws. (visual adjustment)



Be sure to orient the rotary-head gear as shown below.



3. Reassemble the head assembly, head translation board, head-height adjustment shims (A), etc, in the reverse manner of disassembly on page TC-9.
4. Perform the Head-Center and Tape-Path Adjustments on pages TC-13 and TC-14.
5. Perform the Head-Azimuth Adjustment on page TC-16.

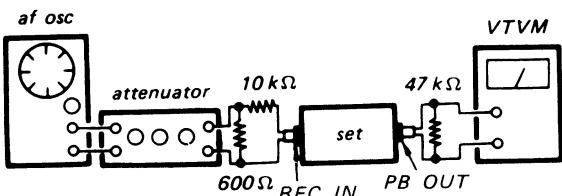
**3-2. ELECTRICAL ADJUSTMENTS**

**Note:** The adjustment should be performed in the order given in this service manual.  
The adjustments should be performed for both L-CH and R-CH.

- Switches and controls should be set as follows unless otherwise specified.

DOLBY NR switch: OFF  
TIMER switch: OFF  
ISS switch: 2

- Standard Record:**  
Deliver the standard input signal level to the input jack and control the attenuator to obtain the standard output signal level.

**Record Mode —****Standard Input Level**

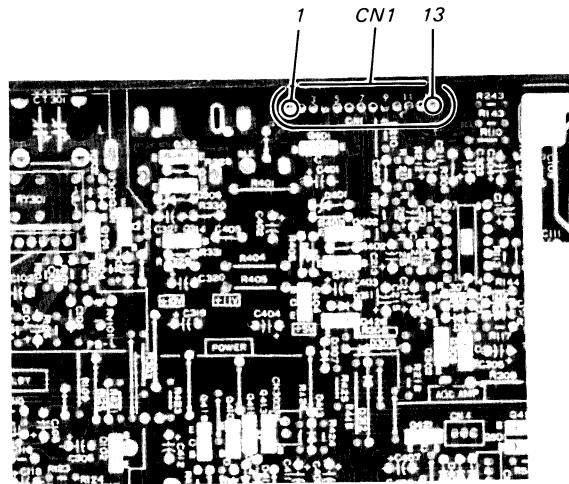
|                  | REC IN         |
|------------------|----------------|
| source impedance | 10 kΩ          |
| input level      | 0.44 V (-5 dB) |

**Standard Output Level**

|                | PB OUT         |
|----------------|----------------|
| load impedance | 47 kΩ          |
| output level   | 0.44 V (-5 dB) |

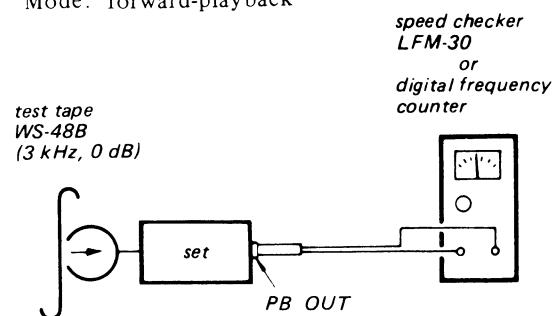
**Locations of REC IN and PB OUT**

|        | CN1 terminal No. |      |     |
|--------|------------------|------|-----|
|        | L-CH             | R-CH | GND |
| REC IN | 10               | 9    | 12  |
| PB OUT | 11               | 13   | 12  |

**Tape Speed Adjustment****Procedure:**

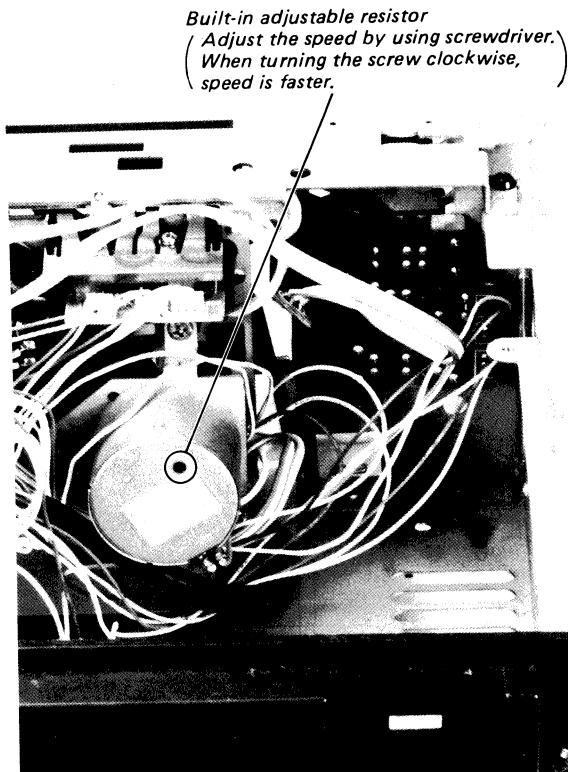
See the left for locations of REC IN and PB OUT.

Mode: forward-playback

**Specification:**

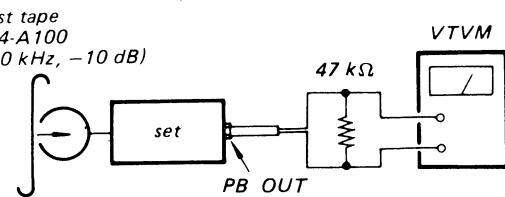
| Speed checker | Digital frequency counter |
|---------------|---------------------------|
| -1 ~ +1 %     | 2,970 Hz to 3,030 Hz      |

Frequency difference between the beginning and the end of the tape should be within 0.8% (25Hz).

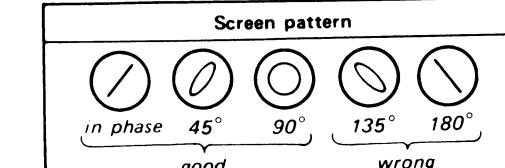
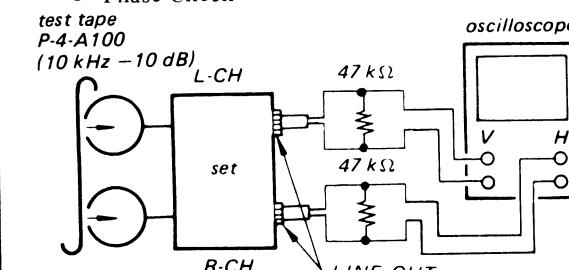
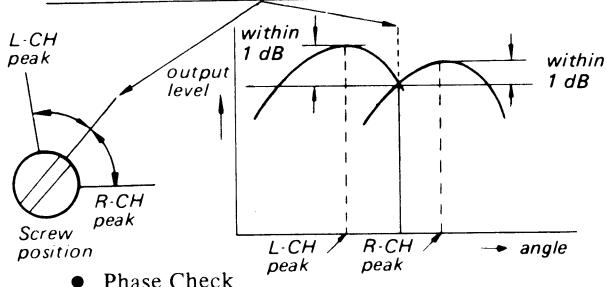
**Adjustment Location:** Motor (M802)**Record/playback Head Azimuth Adjustment****Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

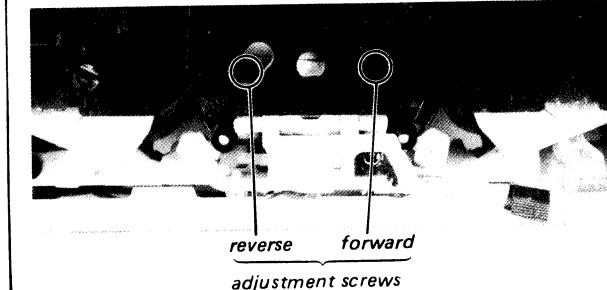
- Mode: forward-playback



- Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screws until both of output levels match together within 1 dB.

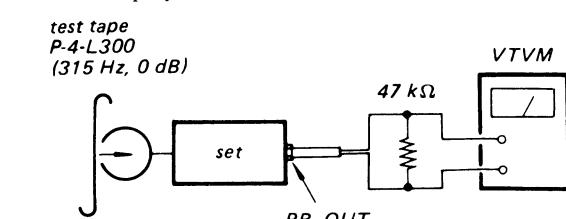


- Set in the reverse-playback mode and repeat the steps 1 ~ 2.
- After the adjustment, lock the screws with locking compound.

**Adjustment Location:****Playback Level Adjustment****Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

Mode: playback



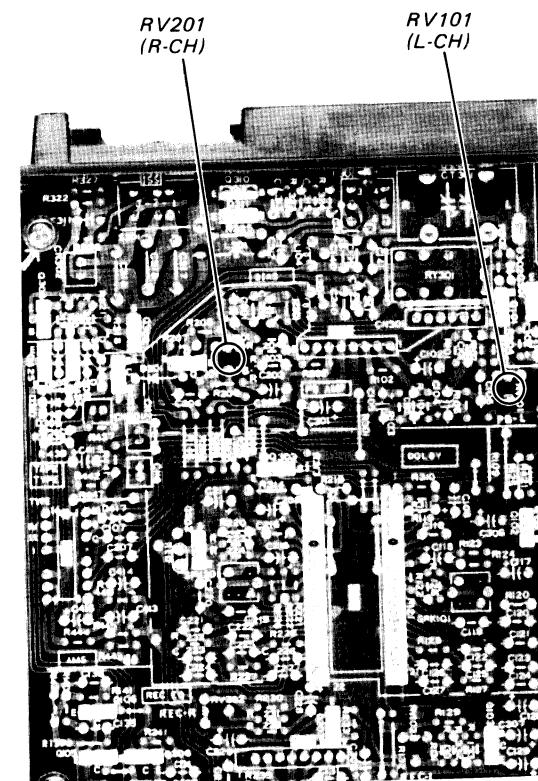
Adjust the RV101 (L-CH) and RV201 (R-CH) so that the specification is met.

**Specification:**

PB OUT level: 0.41 to 0.46 V  
(-5.5 to -4.5 dB)

Level difference between channels:  
less than 0.5 dB

Check that the PB OUT level does not change in playback mode while changing the mode from playback to stop several times.

**Adjustment Location:** audio board

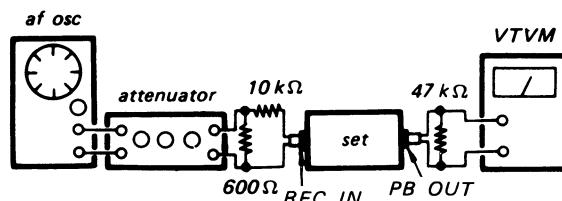
**3-2. ELECTRICAL ADJUSTMENTS**

**Note:** The adjustment should be performed in the order given in this service manual.  
The adjustments should be performed for both L-CH and R-CH.

- Switches and controls should be set as follows unless otherwise specified.

DOLBY NR switch: OFF  
TIMER switch: OFF  
ISS switch: 2

- Standard Record:**  
Deliver the standard input signal level to the input jack and control the attenuator to obtain the standard output signal level.

**— Record Mode —****Standard Input Level**

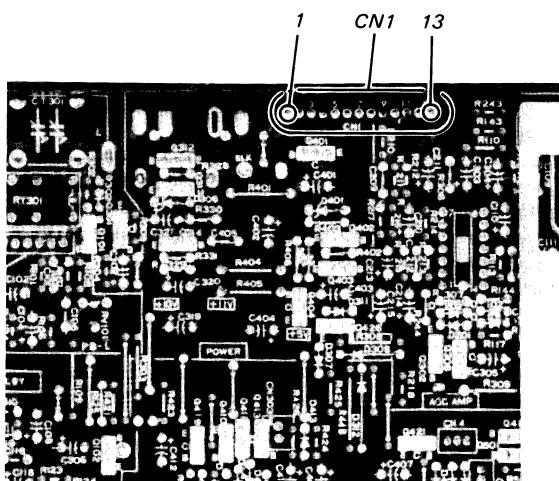
|                  | REC IN         |
|------------------|----------------|
| source impedance | 10 kΩ          |
| input level      | 0.44 V (-5 dB) |

**Standard Output Level**

|                | PB OUT         |
|----------------|----------------|
| load impedance | 47 kΩ          |
| output level   | 0.44 V (-5 dB) |

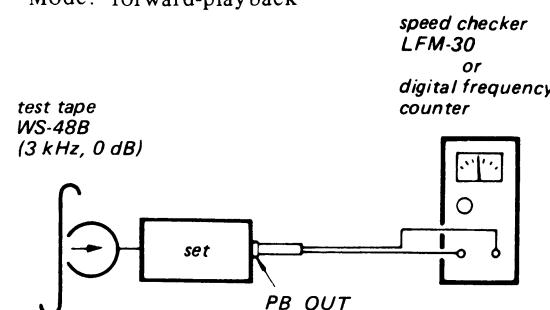
**Locations of REC IN and PB OUT**

|        | CN1 terminal No. |      |     |
|--------|------------------|------|-----|
|        | L-CH             | R-CH | GND |
| REC IN | 10               | 9    | 12  |
| PB OUT | 11               | 13   | 12  |

**Tape Speed Adjustment****Procedure:**

See the left for locations of REC IN and PB OUT.

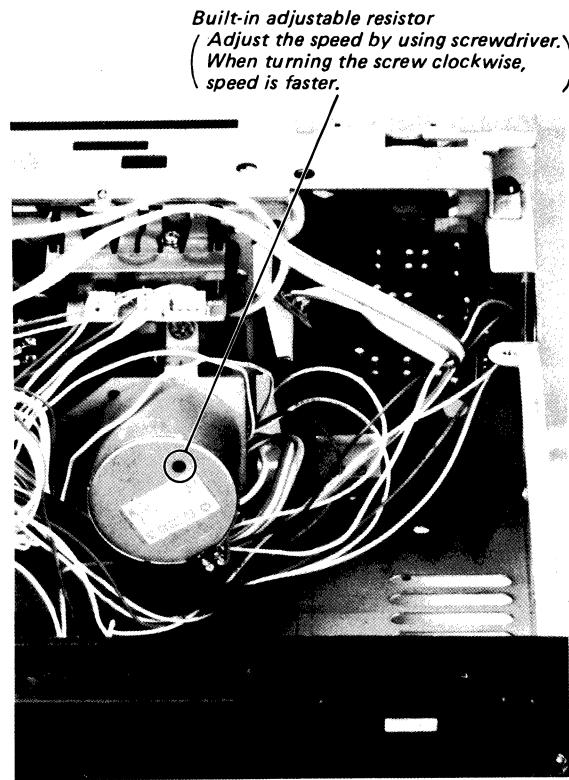
Mode: forward-playback

**Specification:**

| Speed checker | Digital frequency counter |
|---------------|---------------------------|
| -1 ~ +1 %     | 2,970 Hz to 3,030 Hz      |

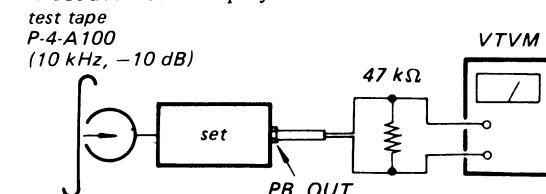
Frequency difference between the beginning and the end of the tape should be within 0.8% (25Hz).

**Adjustment Location:** Motor (M802)

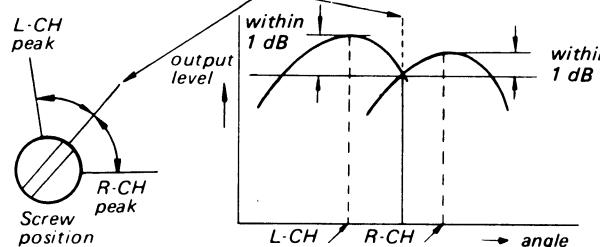
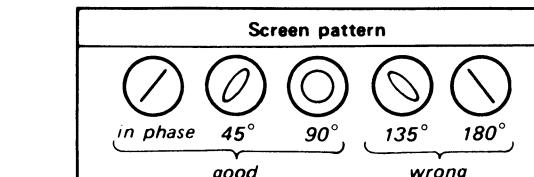
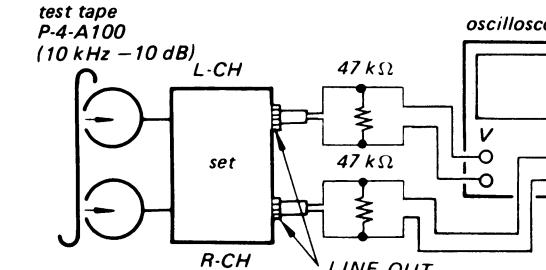
**Record/playback Head Azimuth Adjustment****Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

- Mode: forward-playback



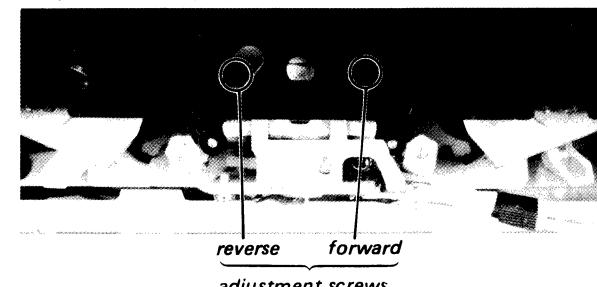
- Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screws until both of output levels match together within 1 dB.

**• Phase Check**

- Set in the reverse-playback mode and repeat the steps 1 ~ 2.

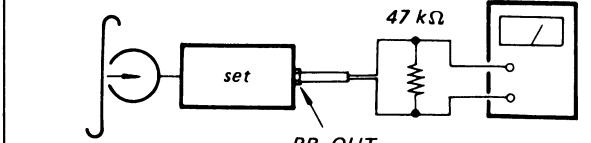
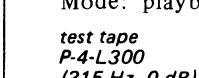
- After the adjustment, lock the screws with locking compound.

**Adjustment Location:**

**Playback Level Adjustment****Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

- Mode: playback



Adjust the RV101 (L-CH) and RV201 (R-CH) so that the specification is met.

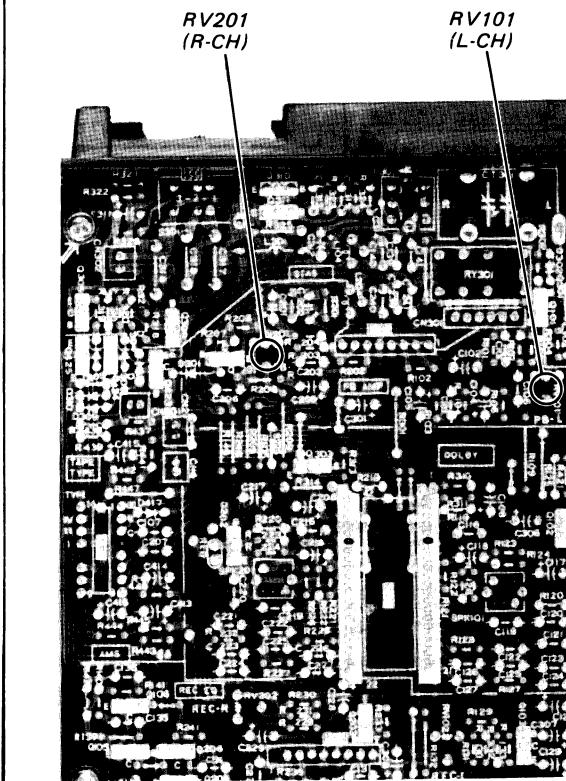
**Specification:**

PB OUT level: 0.41 to 0.46 V  
(-5.5 to -4.5 dB)

Level difference between channels:  
less than 0.5 dB

Check that the PB OUT level does not change in playback mode while changing the mode from playback to stop several times.

**Adjustment Location:** audio board



Note: Before performing Record Bias/Record Level Adjustment, connect pattern.

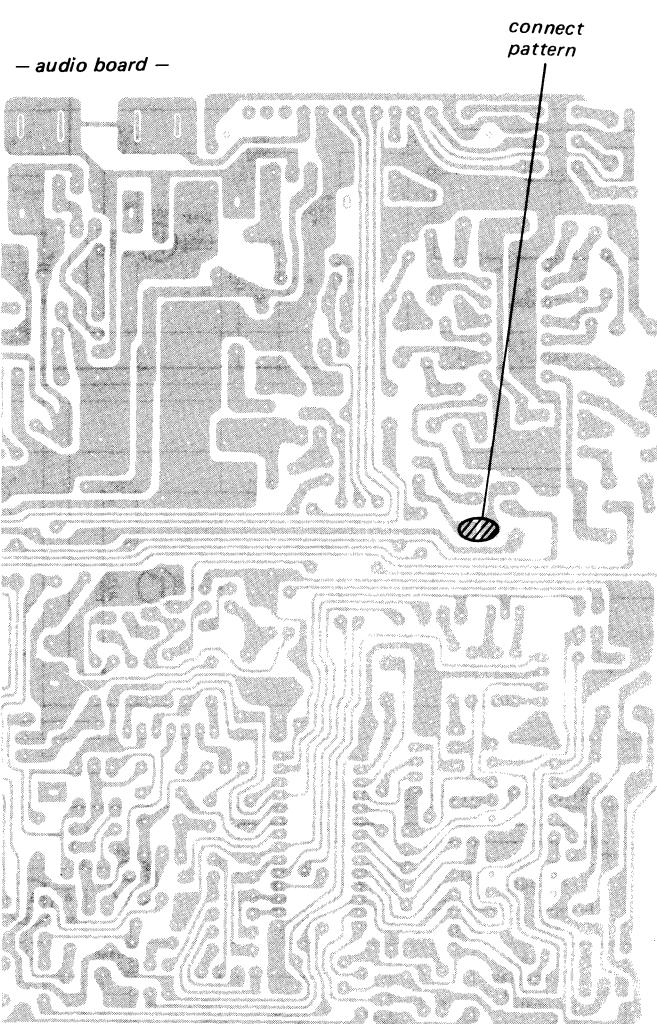


Fig. 1 Connecting Portion at the Adjustment

#### Record Bias Adjustment

##### Setting:

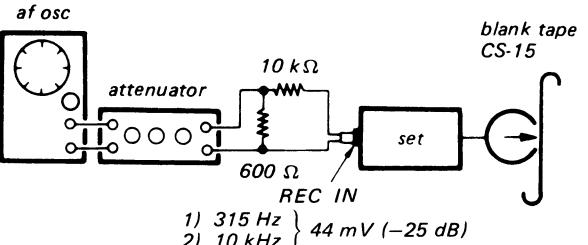
ATTENUATOR: standard record  
(See page TC-15.)

Connect pattern as shown in Fig. 1.

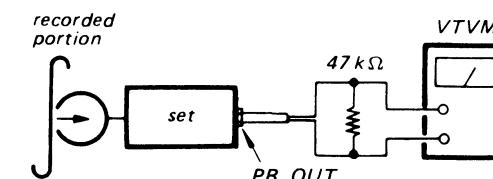
##### Procedure:

See page TC-15 for locations of REC IN and PB OUT.

##### 1. Mode: record



##### 2. Mode: playback

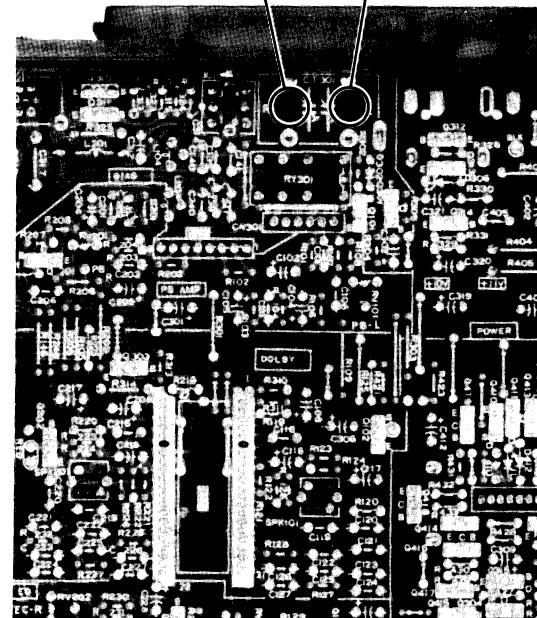


Confirm that the 10 kHz playback output is 0 dB relative to the 315 Hz output. If necessary, adjust CT301-1 (L-CH), CT301-2 (R-CH) and repeat the steps given above.

##### 3. After the adjustment, disconnect pattern.

##### Adjustment Location: audio board

CT301-2      CT301-1  
(R-CH)      (L-CH)



#### Record Level Adjustment

##### Setting:

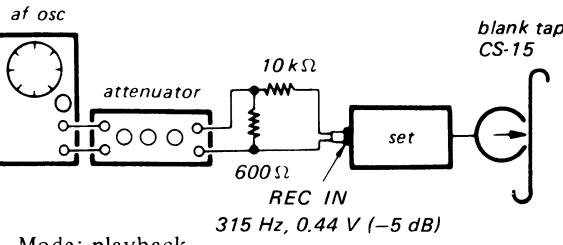
ATTENUATOR: standard record  
(See page TC-15.)

Connect pattern as shown in Fig. 1.

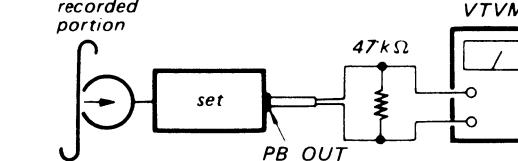
##### Procedure:

See page TC-15 for locations of REC IN and PB OUT.

##### 1. Mode: record



##### 2. Mode: playback



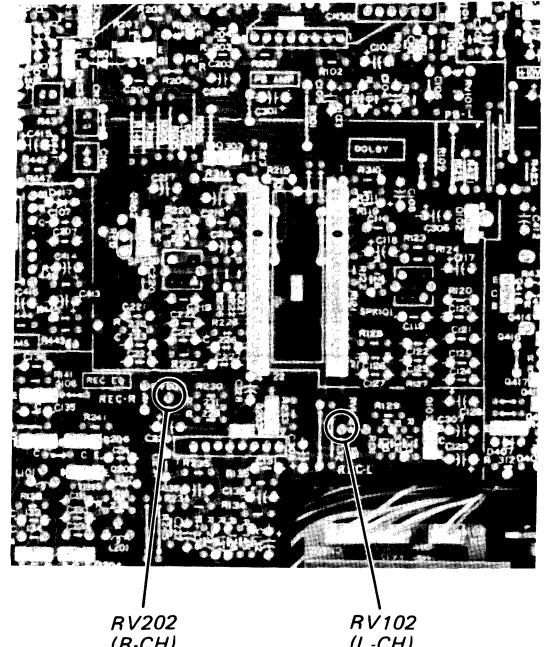
##### 3. Play back the signal recorded in step 1.

Confirm that the signal level is within the specification below. If necessary, adjust RV102 (L-CH), RV202 (R-CH) and repeat the steps 1 - 3.

##### Specification:

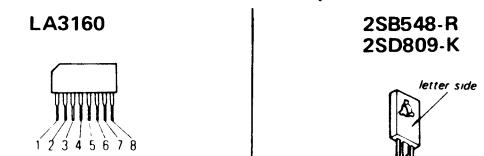
PB OUT level: 0.41 to 0.46 V  
(-5.5 to -4.5 dB)

##### 4. After the adjustment, disconnect pattern.



#### ● Semiconductor Lead Layouts

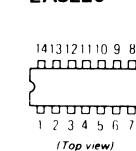
LA3160



2SB548-R  
2SD809-K

HZ11A1L  
HZ11B2L  
HZ26B1L

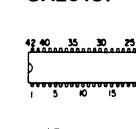
LA3220



2SB1013  
2SD1387

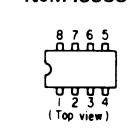
SPI201-20

CX20187



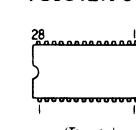
2SC2603-F  
DTA114ES  
DTA144ES  
DTC144ES

NJM4558S



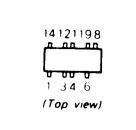
GL-1EG102  
GL-1HY102  
GL-1PR102

TC9312N-001



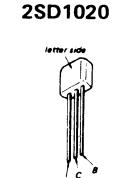
cathode  
anode

CX10034



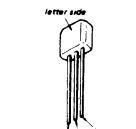
GL-8PG1

2SA1175  
2SD1020



cathode  
anode

1SS202-1



cathode  
anode

Note: Before performing Record Bias/Record Level Adjustment, connect pattern.

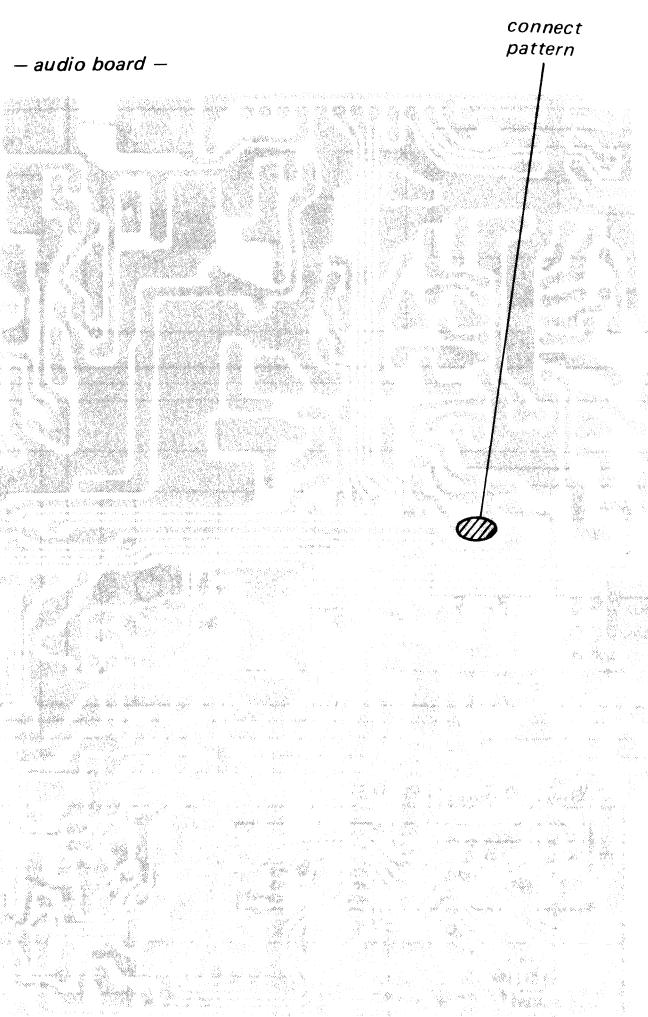


Fig. 1 Connecting Portion at the Adjustment

#### Record Bias Adjustment

##### Setting:

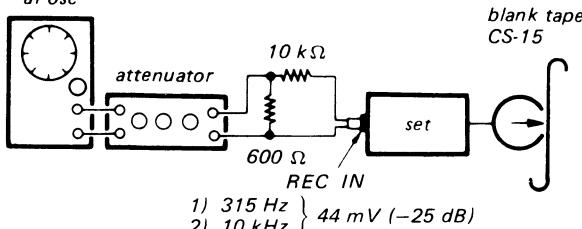
ATTENUATOR: standard record  
(See page TC-15.)

Connect pattern as shown in Fig. 1.

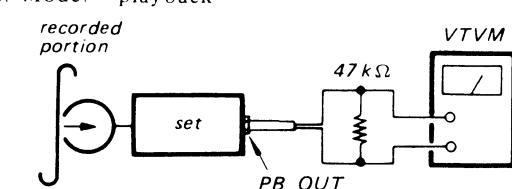
##### Procedure:

See page TC-15 for locations of REC IN and PB OUT.

1. Mode: record  
*af osc*



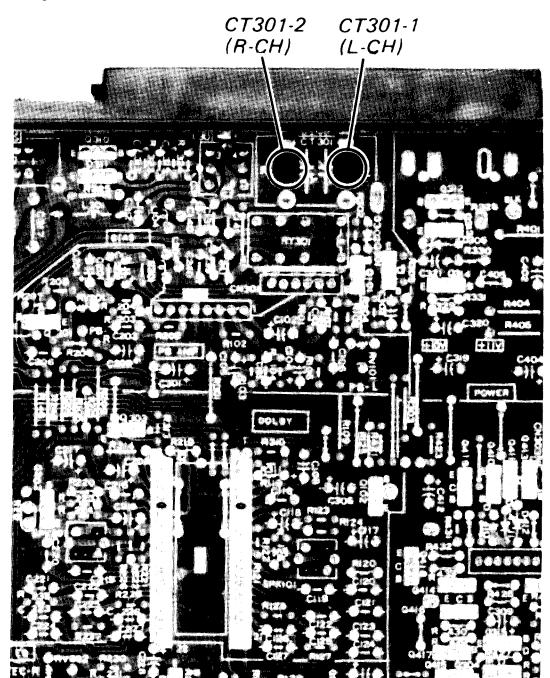
2. Mode: playback



Confirm that the 10 kHz playback output is 0 dB relative to the 315 Hz output. If necessary, adjust CT301-1 (L-CH), CT301-2 (R-CH) and repeat the steps given above.

3. After the adjustment, disconnect pattern.

**Adjustment Location:** audio board



#### Record Level Adjustment

##### Setting:

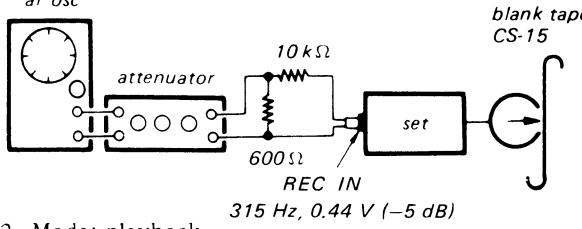
ATTENUATOR: standard record  
(See page TC-15.)

Connect pattern as shown in Fig. 1.

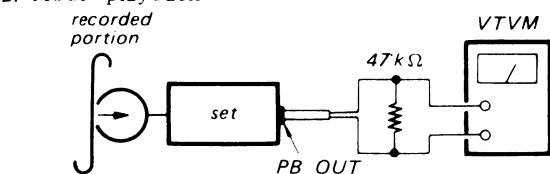
##### Procedure:

See page TC-15 for locations of REC IN and PB OUT.

1. Mode: record  
*af osc*



2. Mode: playback



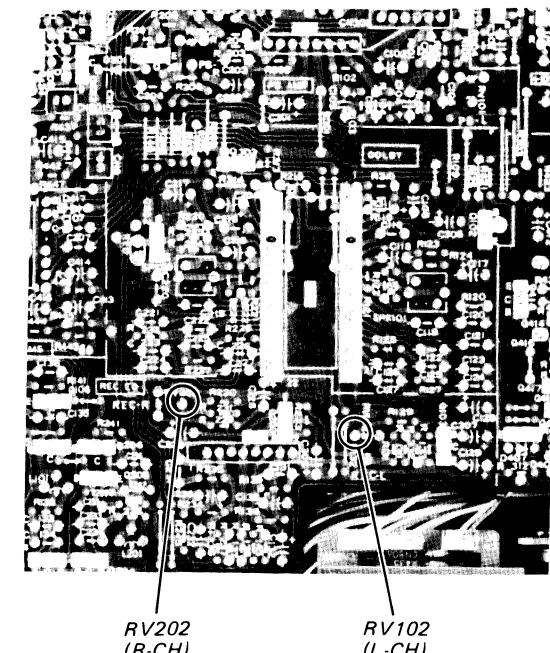
3. Play back the signal recorded in step 1.

Confirm that the signal level is within the specification below. If necessary, adjust RV102 (L-CH), RV202 (R-CH) and repeat the steps 1 – 3.

##### Specification:

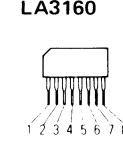
PB OUT level: 0.41 to 0.46 V  
(-5.5 to -4.5 dB)

4. After the adjustment, disconnect pattern.

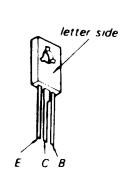


#### ● Semiconductor Lead Layouts

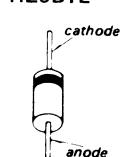
LA3160



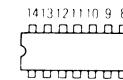
HZ5548-R  
2SD809-K



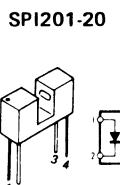
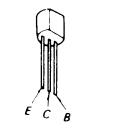
HZ11A1L  
HZ11B2L  
HZ6B1L



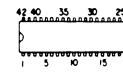
LA3220



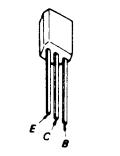
2SB1013  
2SD1387



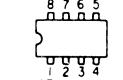
CX20187



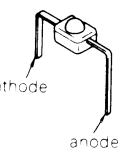
2SC2603-F  
DTA114ES  
DTA144ES  
DTC144ES



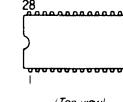
NJM4558S



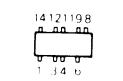
GL-1EG102  
GL-1HY102  
GL-1PR102



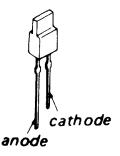
TC9312N-001



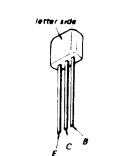
CX10034



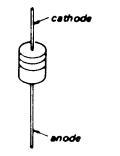
GL-8PG1



2SA1175  
2SD1020



1SS202-1

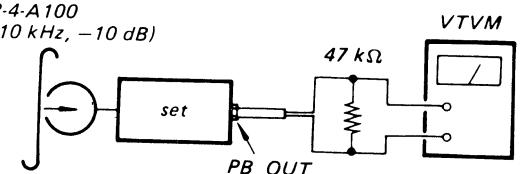


**Record/playback Head Azimuth Adjustment****Procedure:**

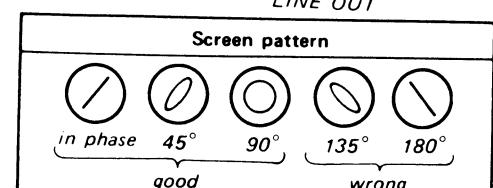
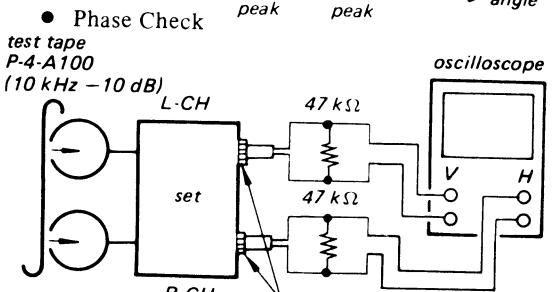
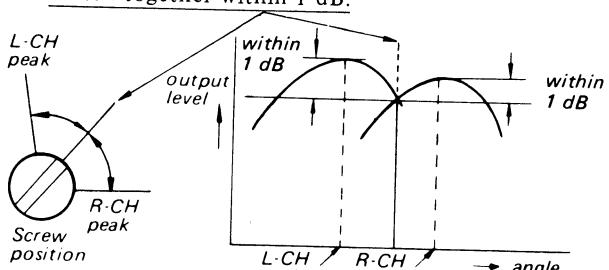
See page TC-15 for locations of REC IN and PB OUT.

1. Mode: forward-playback

*test tape*  
P-4-A100  
(10 kHz, -10 dB)

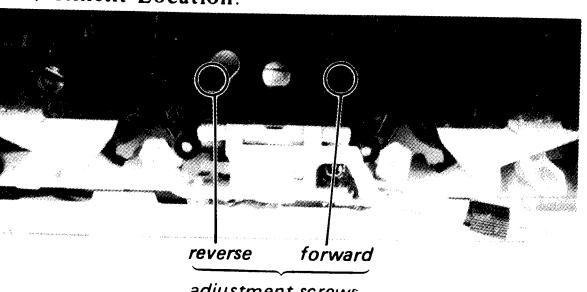


2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screws until both of output levels match together within 1 dB.



3. Set in the reverse-playback mode and repeat the steps 1 - 2.

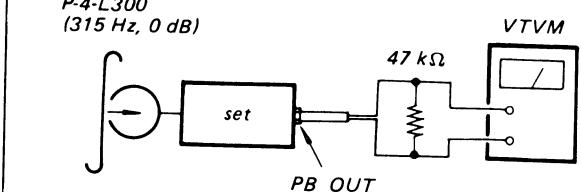
4. After the adjustment, lock the screws with locking compound.

**Adjustment Location:****Playback Level Adjustment****Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

Mode: playback

*test tape*  
P-4-L300  
(315 Hz, 0 dB)



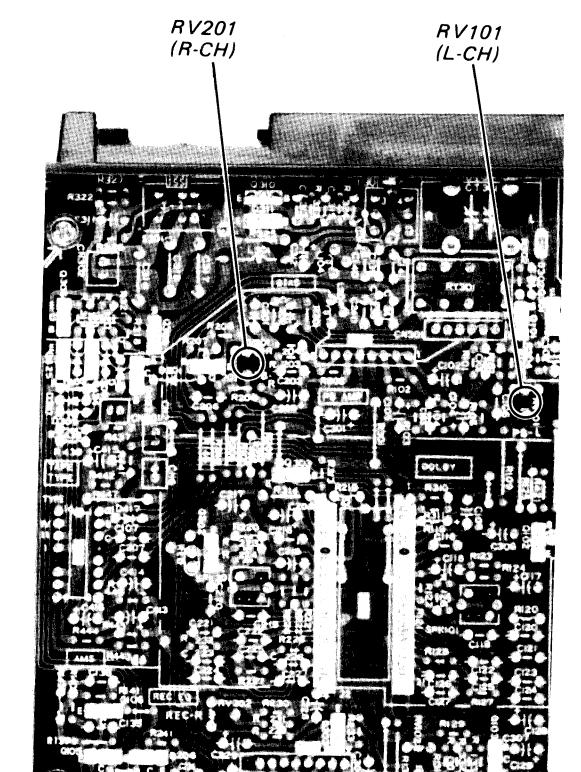
Adjust the RV101 (L-CH) and RV201 (R-CH) so that the specification is met.

**Specification:**

PB OUT level: 0.41 to 0.46 V  
(-5.5 to -4.5 dB)

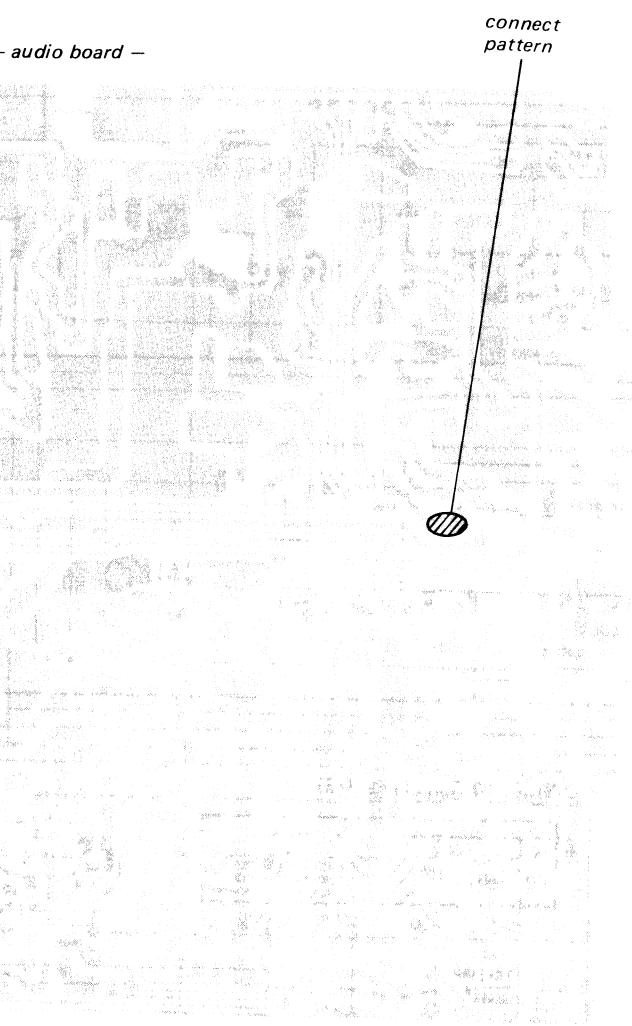
Level difference between channels:  
less than 0.5 dB

Check that the PB OUT level does not change in playback mode while changing the mode from playback to stop several times.

**Adjustment Location:** audio board

**Note:** Before performing Record Bias/Record Level Adjustment, connect pattern.

- audio board -

**Record Bias Adjustment****Setting:**

ATTENUATOR: standard record  
(See page TC-15.)

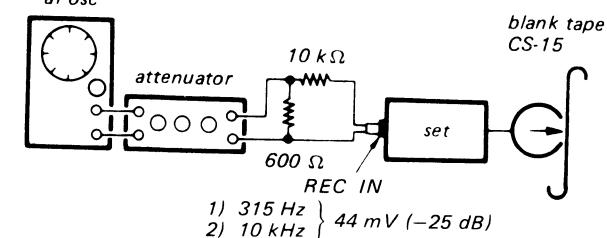
Connect pattern as shown in Fig. 1.

**Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

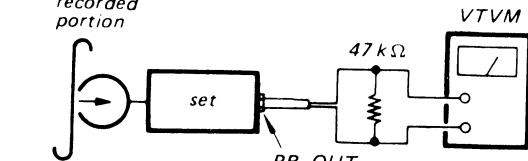
1. Mode: record

*af osc*



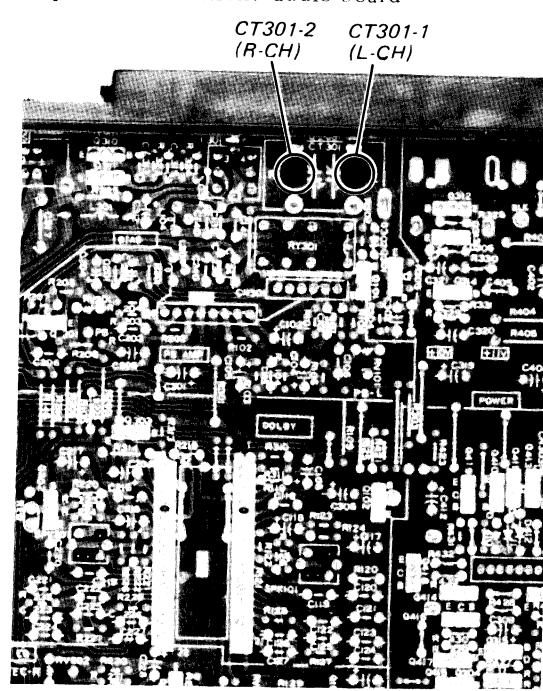
2. Mode: playback

*recorded portion*



Confirm that the 10 kHz playback output is 0 dB relative to the 315 Hz output. If necessary, adjust CT301-1 (L-CH), CT301-2 (R-CH) and repeat the steps given above.

3. After the adjustment, disconnect pattern.

**Adjustment Location:** audio board**Record Level Adjustment****Setting:**

ATTENUATOR: standard record  
(See page TC-15.)

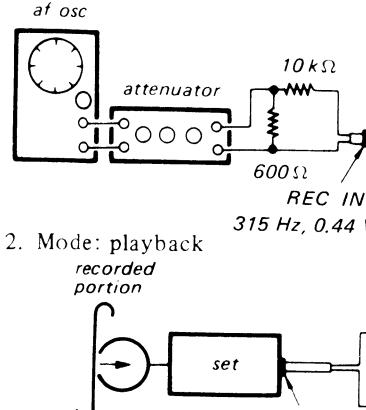
Connect pattern as shown in Fig. 1.

**Procedure:**

See page TC-15 for locations of REC IN and PB OUT.

1. Mode: record

*af osc*



2. Mode: playback

*recorded portion*



3. Play back the signal recorded in

Fig. 1

Confirm that the signal level is

cation below. If necessary, adj

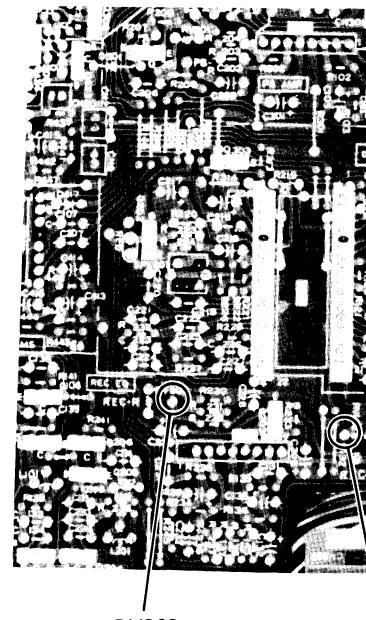
RV202 (R-CH) and repeat the s

**Specification:**

PB OUT level: 0.41 to 0.46 V

(-5.5 to -4.5 dB)

4. After the adjustment, disconnect



**d/playback Head Azimuth Adjustment**

**Procedure:**  
See page TC-15 for locations of REC IN and PB OUT.  
Mode: forward-playback  
Type:  
100 Hz, -10 dB

Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screws until both of output levels match together within 1 dB.

Phase Check  
Tape P-4-L300 (315 Hz, 0 dB)

Screen pattern  
100 Hz, -10 dB

Set in the reverse-playback mode and repeat the steps 1 – 2.  
After the adjustment, lock the screws with locking compound.

**Adjustment Location:**

**Playback Level Adjustment**

**Procedure:**  
See page TC-15 for locations of REC IN and PB OUT.  
Mode: playback  
test tape P-4-L300 (315 Hz, 0 dB)

Adjust the RV101 (L-CH) and RV201 (R-CH) so that the specification is met.

**Specification:**  
PB OUT level: 0.41 to 0.46 V (-5.5 to -4.5 dB)  
Level difference between channels: less than 0.5 dB  
Check that the PB OUT level does not change in playback mode while changing the mode from playback to stop several times.

**Adjustment Location:** audio board

**Note:** Before performing Record Bias/Record Level Adjustment, connect pattern.

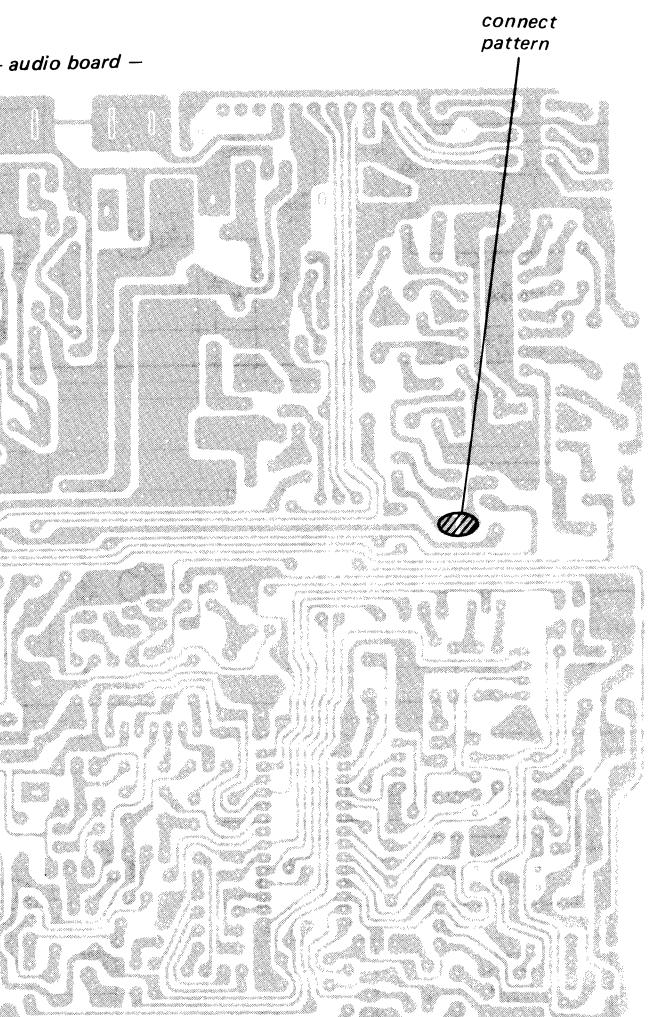


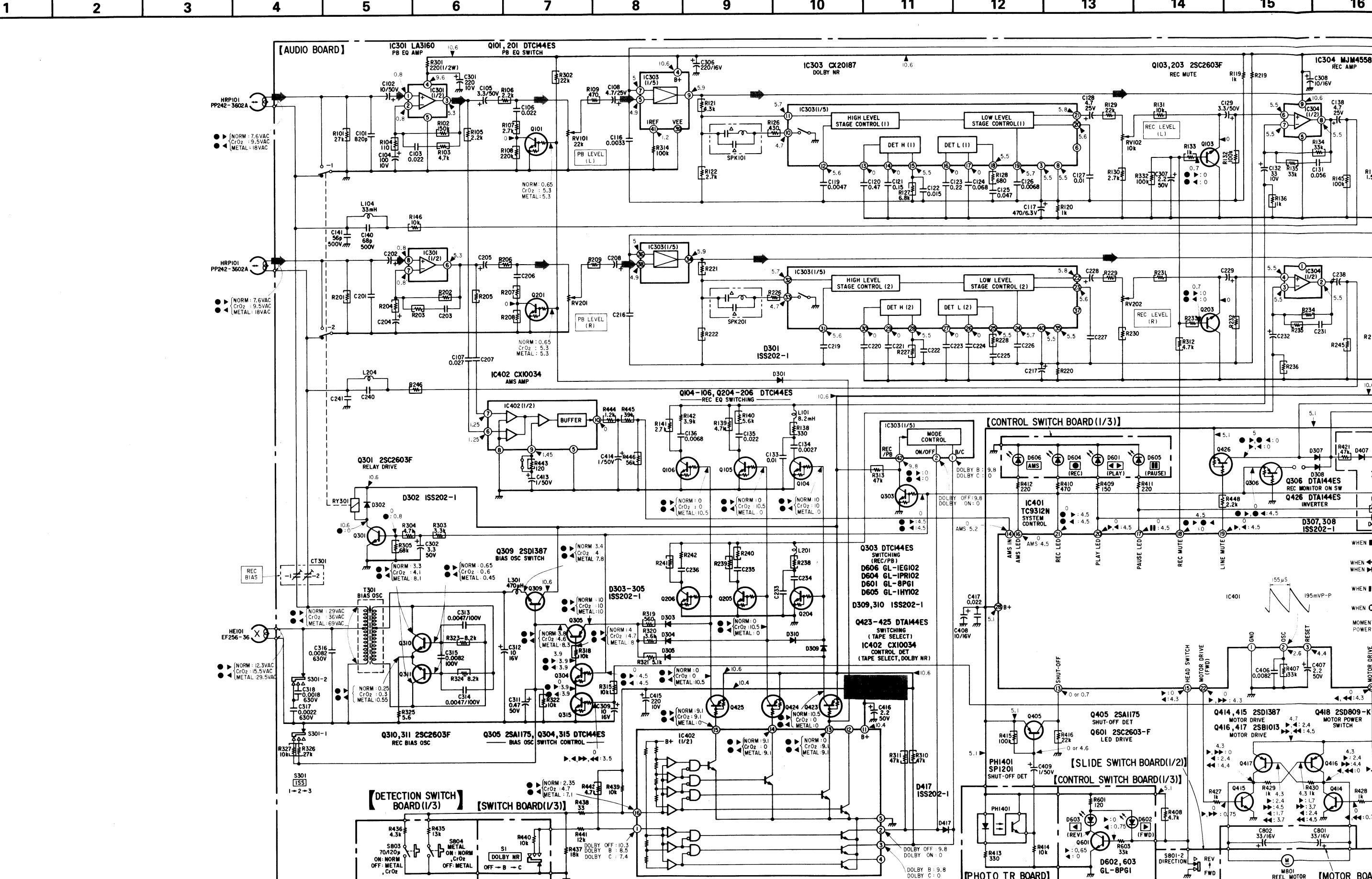
Fig. 1 Connecting Portion at the Adjustment

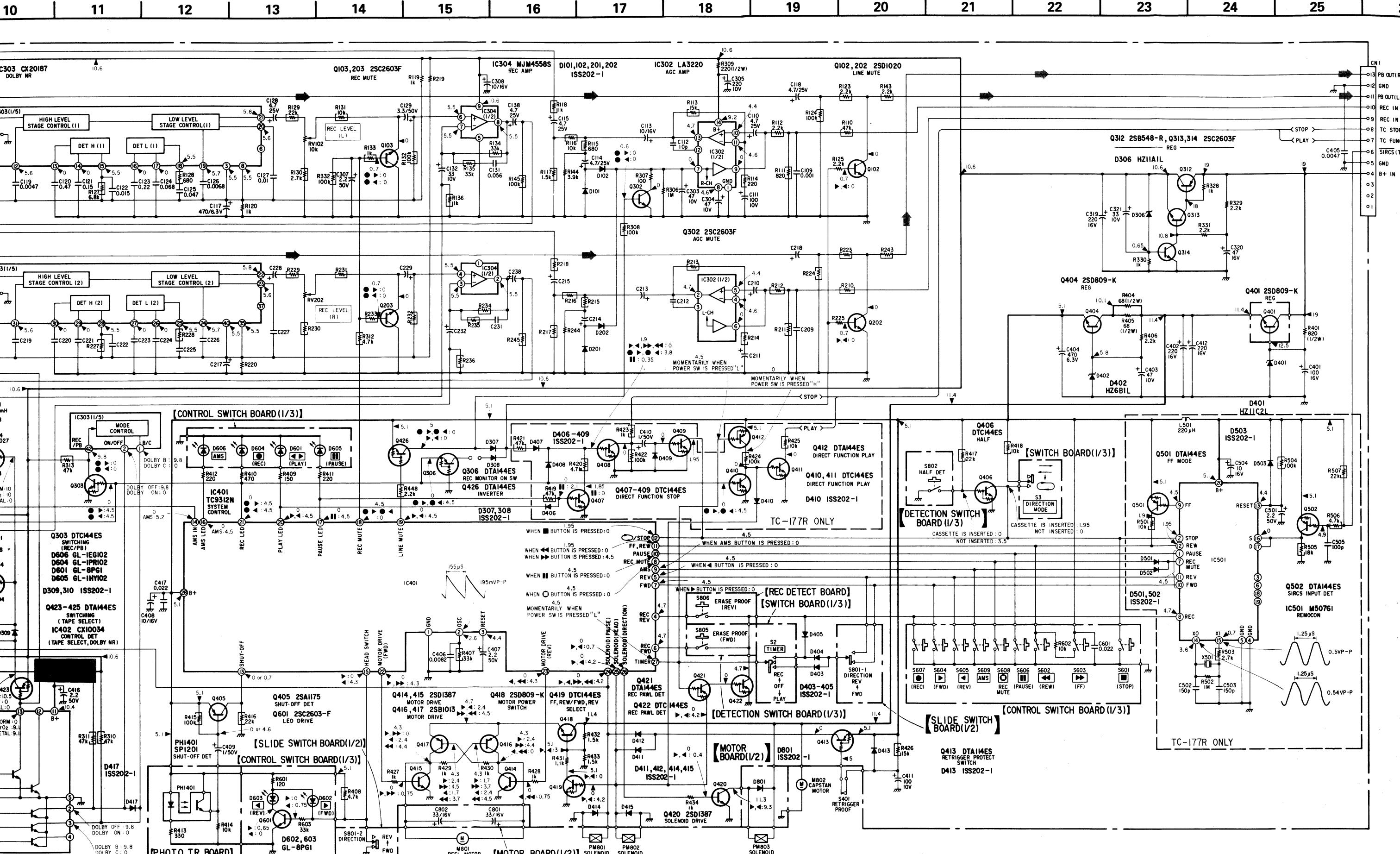
|   |  |
|---|--|
| <p><b>Record Bias Adjustment</b></p> <p><b>Setting:</b><br/>ATTENUATOR: standard record (See page TC-15.)<br/>Connect pattern as shown in Fig. 1.</p> <p><b>Procedure:</b><br/>See page TC-15 for locations of REC IN and PB OUT.</p> <ol style="list-style-type: none"> <li>1. Mode: record<br/>af osc → attenuator → 10 kΩ → 600 Ω → REC IN<br/>1) 315 Hz } 44 mV (-25 dB)<br/>2) 10 kHz }</li> <li>2. Mode: playback<br/>recorded portion → set → 47 kΩ → VTVM → PB OUT</li> <li>3. Play back the signal recorded in step 1<br/>Confirm that the 10 kHz playback output is 0 dB relative to the 315 Hz output. If necessary, adjust CT301-1 (L-CH), CT301-2 (R-CH) and repeat the steps given above.</li> <li>4. After the adjustment, disconnect pattern.</li> </ol> <p><b>Adjustment Location:</b> audio board</p> | <p><b>Record Level Adjustment</b></p> <p><b>Setting:</b><br/>ATTENUATOR: standard record (See page TC-15.)<br/>Connect pattern as shown in Fig. 1.</p> <p><b>Procedure:</b><br/>See page TC-15 for locations of REC IN and PB OUT.</p> <ol style="list-style-type: none"> <li>1. Mode: record<br/>af osc → attenuator → 10 kΩ → 600 Ω → REC IN<br/>315 Hz, 0.44 V (-5 dB)</li> <li>2. Mode: playback<br/>recorded portion → set → 47 kΩ → PB OUT</li> <li>3. Play back the signal recorded in step 1<br/>Confirm that the signal level is within the specification below. If necessary, adjust RV202 (R-CH) and repeat the steps 1 – 2.</li> <li>4. After the adjustment, disconnect pattern.</li> </ol> <p><b>Specification:</b><br/>PB OUT level: 0.41 to 0.46 V (-5.5 to -4.5 dB)</p> |
|---|--|

**SECTION 4  
DIAGRAMS**

**FH-150R  
TC-177R**

**4-1. SCHEMATIC DIAGRAM**

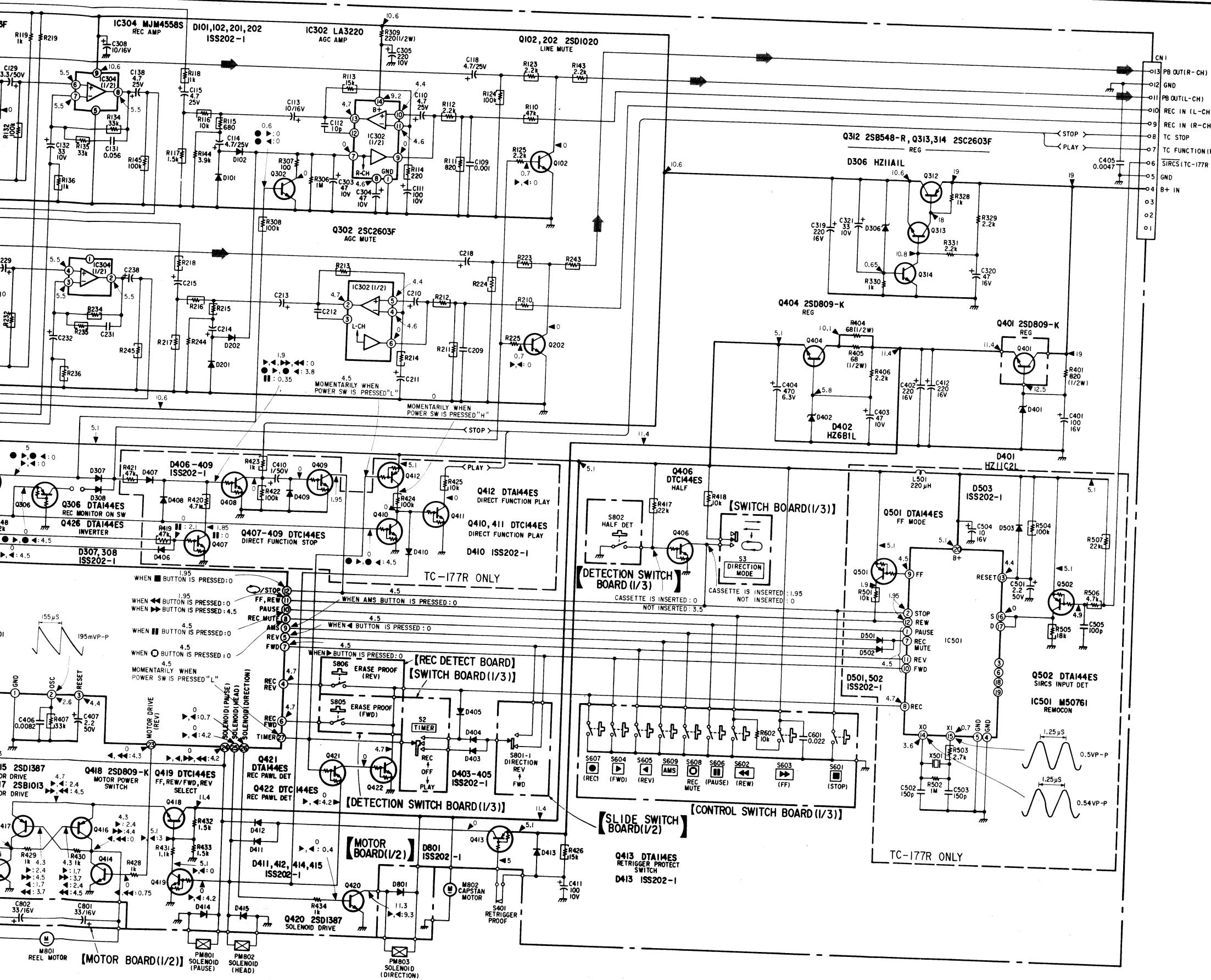




**FH-150R**  
**TC-177R**

**FH-150R**  
**TC-177R**

A horizontal ruler scale with markings from 15 to 26 inches. The numbers are labeled above the ruler. There are vertical tick marks at each integer, and a solid horizontal line extends from the 15 mark to the 26 mark.



- Note: All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\mu\text{F}$  50WV or less are not indicated except for electrolytics and tantalums.
  - All resistors are in  $\Omega$  and  $1/4\text{W}$  or less unless otherwise specified.
  -  : signal path.
  - Components for right channel have same values as for left channel. Reference numbers are coded from 200.
  -  : fusible resistor.
  -  : printed resistor.
  -  : B+ bus.
  -  : adjustment for repair.
  - AC voltage readings in the bias oscillator with a VTVM.
  - Voltages are dc with respect to ground unless otherwise noted.
  - Readings are taken under no-signal conditions with a VOM ( $50\text{ k}\Omega/\text{V}$ ).
  - Voltage variations may be noted due to normal production tolerances.
  -  : FWD                             : REV
  -  : REW                             : REC
  -  : PAUSE                            No mark: STOP
  -  : REC REV
  -  : FF
  -  : REC MUTE
  -  : REC FWD
  - Waveforms are taken to ground under no-signal conditions with oscilloscope.  
Voltage variations may be noted due to normal production tolerances.

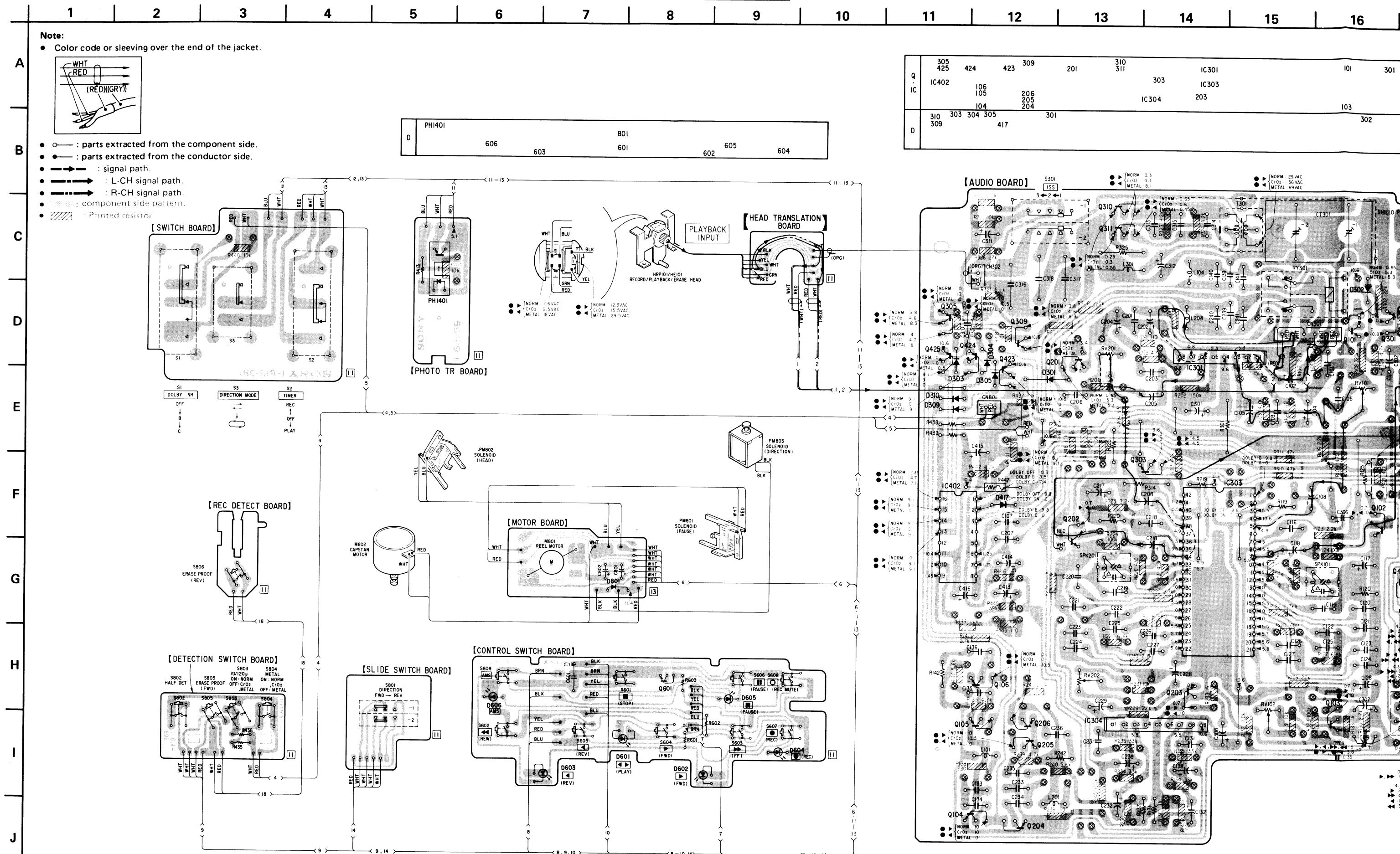
| Ref. No. | Switch            | Position |
|----------|-------------------|----------|
| S1       | DOLBY NR          | OFF      |
| S2       | TIMER             | OFF      |
| S3       | DIRECTION MODE    | →        |
| S301     | ISS               | 1        |
| S401     | RETRIGGER PROOF   | OFF      |
| S601     | ■ (STOP)          | OFF      |
| S602     | ◀ (REW)           | OFF      |
| S603     | ▶ (FF)            | OFF      |
| S604     | ► (FWD)           | OFF      |
| S605     | ◀ (REV)           | OFF      |
| S606     | ■ (PAUSE)         | OFF      |
| S607     | ● (REC)           | OFF      |
| S608     | ○ (REC MUTE)      | OFF      |
| S609     | AMS               | OFF      |
| S801     | DIRECTION         | FWD      |
| S802     | HALF DET          | OFF      |
| S803     | 70/120 μ          | OFF      |
| S804     | METAL             | OFF      |
| S805     | ERASE PROOF (FWD) | OFF      |
| S806     | ERASE PROOF (REV) | OFF      |

**Note:** The components identified by shading and mark  
 are critical for safety. Replace only with  
part number specified.

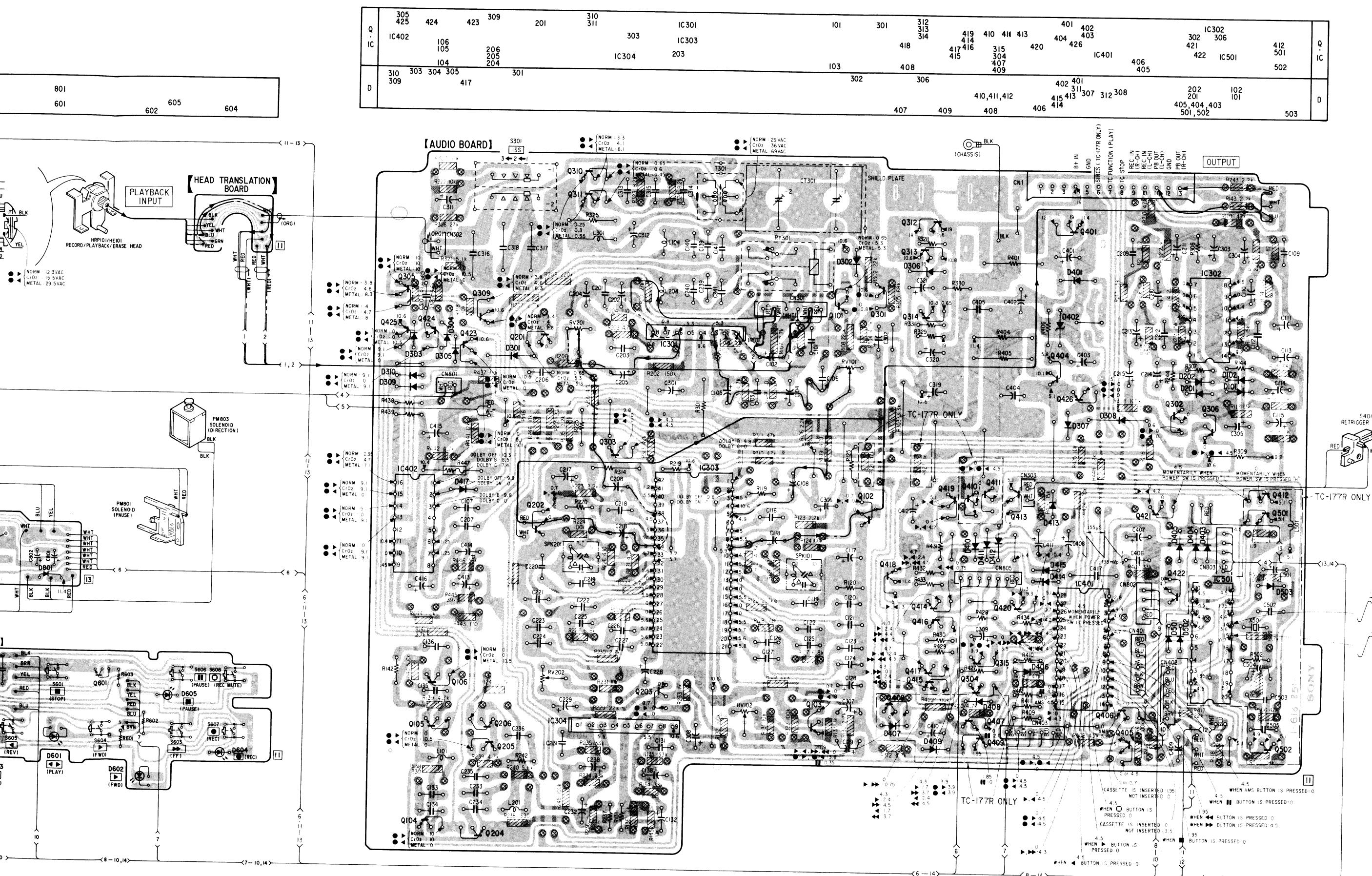
# **FH-150R**

# **TC-177R**

## **4-2. MOUNTING DIAGRAM**



7      8      9      10      11      12      13      14      15      16      17      18      19      20      21      22



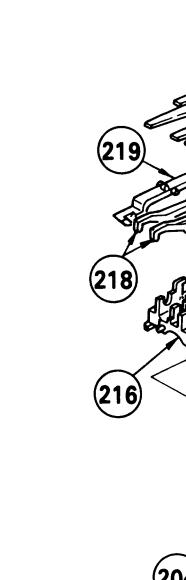
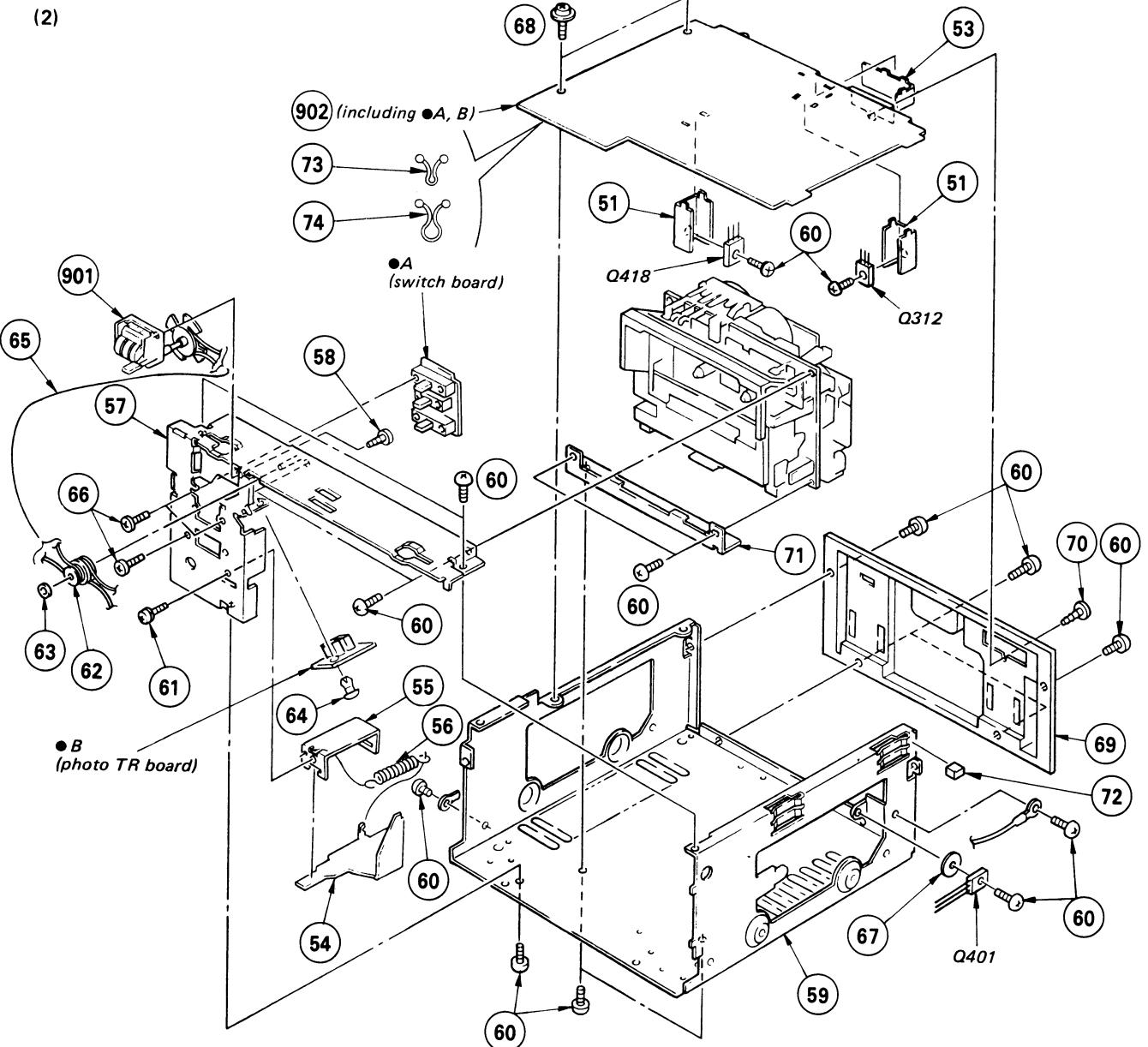
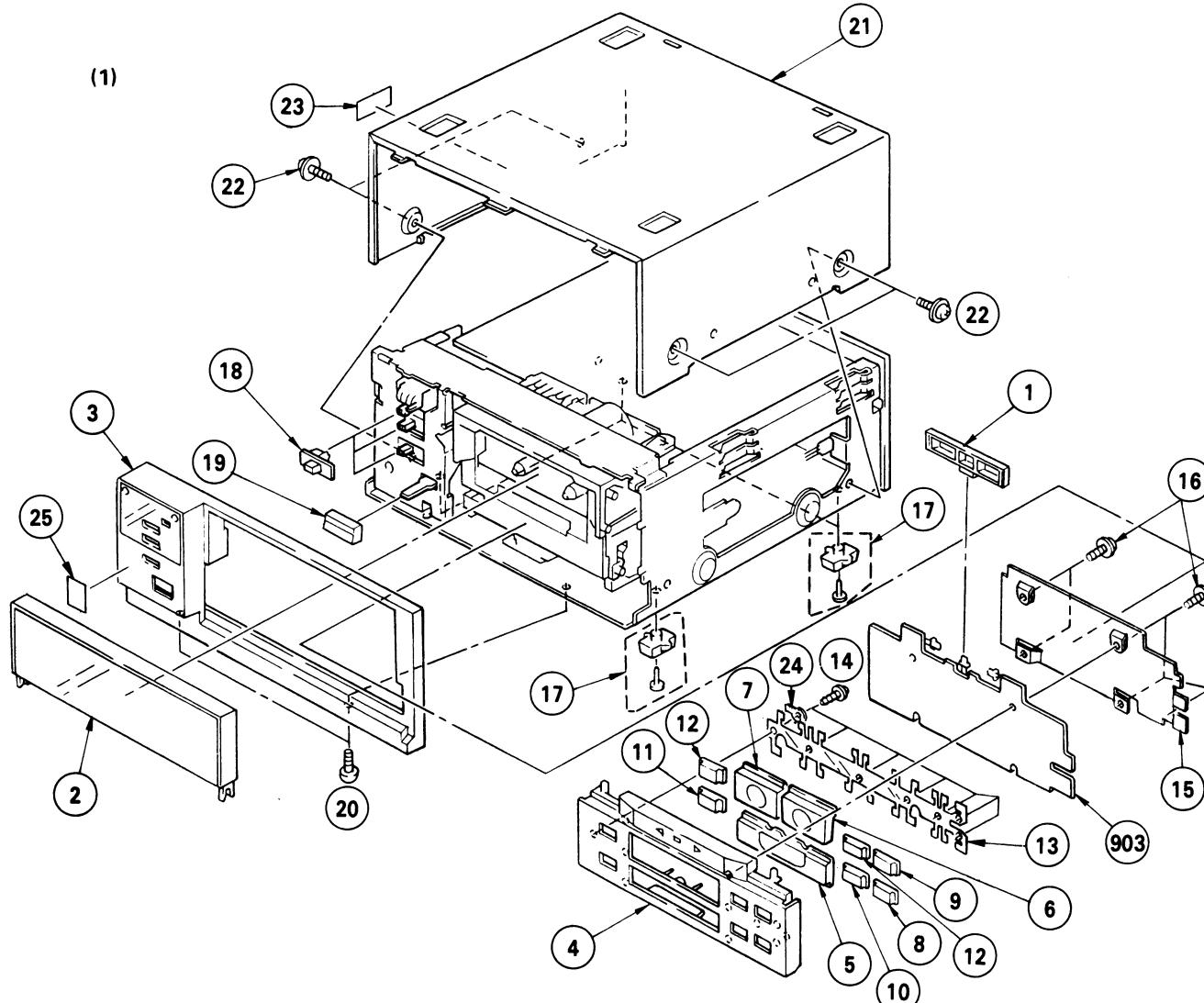
SECTION 5  
EXPLODED VIEWS AND PARTS LIST

**NOTE:**  
The mechanical parts with no reference number in the exploded views are not supplied.

Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The construction parts of an assembled part are indicated with a collation number in the remark column.

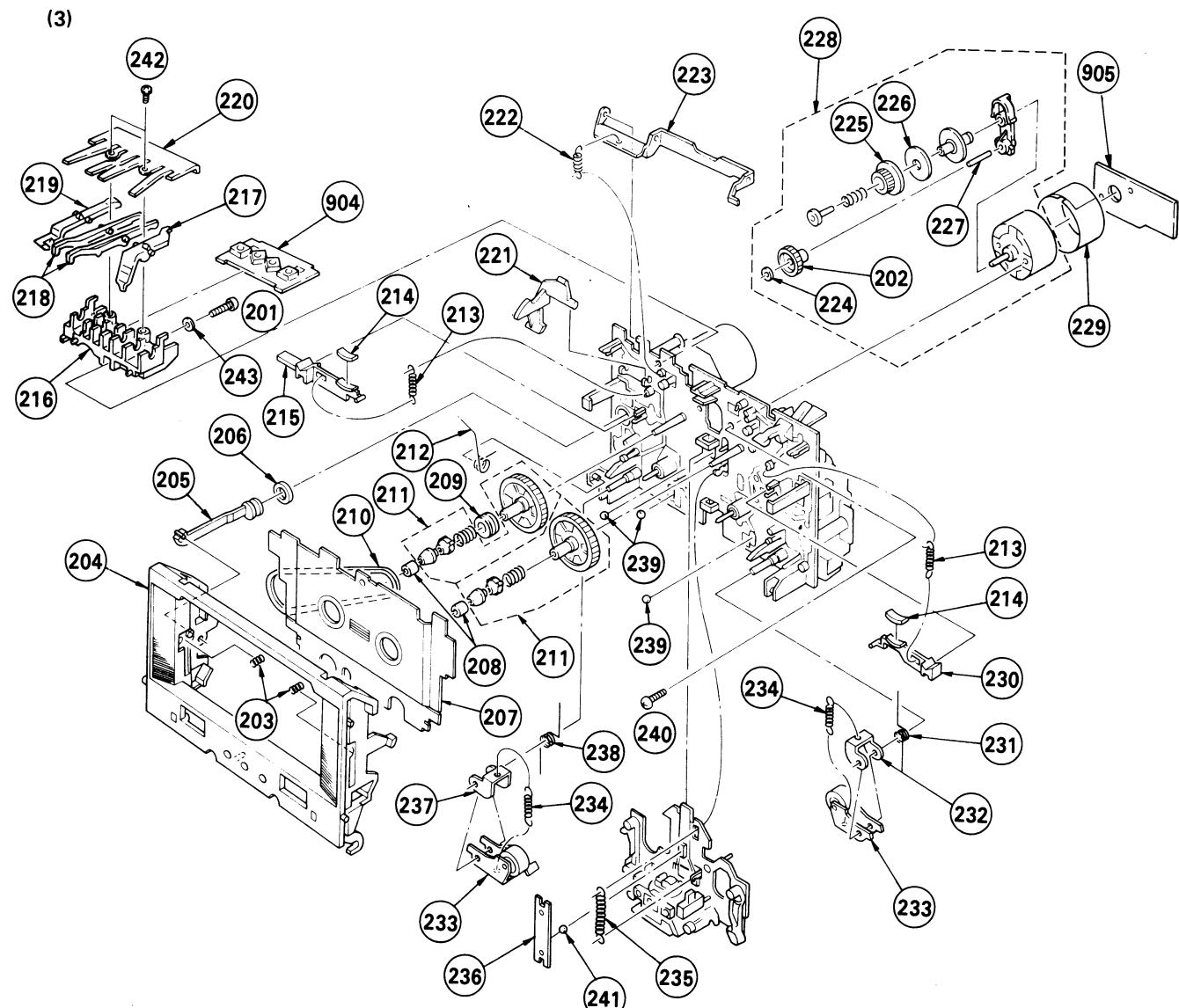
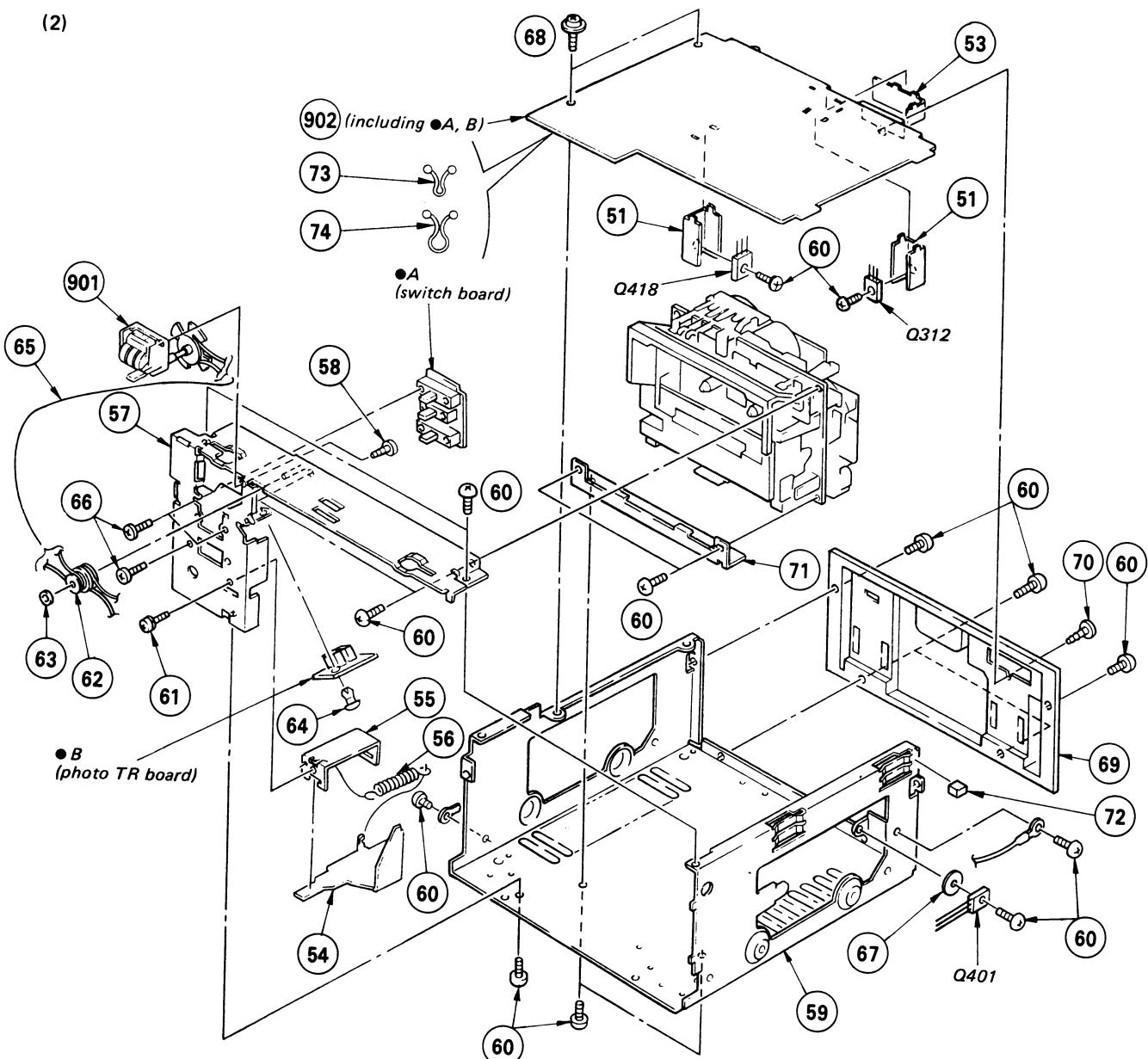
The components identified by shading and mark are critical for safety. Replace only with part number specified.



| No. | Part No.   | Description          | Remarks | No. | Part No.      | Description                     | Remarks |
|-----|--|----------------------|---------|-----|---------------|---------------------------------|---------|
| 1   | *3-325-508-01  | HOUSE, LED           |         | 13  | 3-325-512-01  | SPRING                          |         |
| 2   | X-3325-542-1 (E model).....WINDOW ASSY, CASSETTE         |                      |         | 14  | 7-687-202-11  | TOTSU, TAPPING PTPWH 2X4        |         |
|     | X-3325-543-1 (EXCEPT FOR E model)..WINDOW ASSY, CASSETTE |                      |         | 15  | *3-325-511-01 | PLATE, SHIELD                   |         |
| 3   | X-3325-523-1   | PANEL ASSY, FRONT    |         | 16  | 7-687-233-11  | SCREW, TOTSU PTPWH 2.6X6, TYPE2 |         |
| 4   | X-3325-525-1   | ESCIUTCHEON ASSY     |         | 17  | X-4902-937-1  | FOOT ASSY, RUBBER               |         |
| 5   | 3-325-506-01   | BUTTON (B), STOP     |         | 18  | 3-307-538-21  | KNOB, SWITCH, TIMER             |         |
| 6   | 3-325-504-01   | BUTTON (B), FWD      |         | 19  | 3-575-533-31  | BUTTON, EJECT                   |         |
| 7   | 3-325-505-01   | BUTTON (B), REV      |         | 20  | 7-685-871-01  | SCREW +BVTT 3X6 (S)             |         |
| 8   | 3-325-503-31   | BUTTON (B), REC MUTE |         | 21  | 4-910-078-31  | CASE                            |         |
| 9   | 3-325-503-11   | BUTTON, REC          |         | 22  | 4-886-821-01  | SCREW, M3 CASE                  |         |
| 10  | 3-325-503-21   | BUTTON (B), PAUSE    |         | 23  | *3-325-581-01 | LABEL, MODEL NUMBER (W)         |         |
| 11  | 3-325-503-41   | BUTTON, AMS          |         | 24  | 7-623-505-01  | LUG, 2                          |         |
| 12  | 3-325-503-01   | BUTTON (B), FF.REW   |         | 25  | 3-703-709-41  | STICKER, SONY SYMBOL (15)       |         |
|     |  |                      |         | 903 | *1-615-390-11 | PC BOARD, CONTROL SWITCH        |         |

| No. | Part No.      | Description                | Remarks | No.  | Part No.      | Description                     | Remarks |
|-----|---------------|----------------------------|---------|------|---------------|---------------------------------|---------|
| 51  | *3-312-615-31 | HEAT SINK                  |         | 66   | 7-621-775-10  | SCREW +B 2.6X4                  |         |
| 53  | *3-325-515-01 | PLATE, SHIELD              |         | 67   | 3-572-365-11  | SHEET, INSULATING (A)           |         |
| 54  | *3-325-513-01 | SLIDER, EJECT              |         | 68   | 3-703-249-01  | SCREW, S TIGHT, +PTTWH 3X6      |         |
| 55  | *3-575-502-00 | BRACKET, EJECT             |         | 69   | 3-309-129-71  | PLATE, JACK                     |         |
| 56  | 3-534-238-XX  | SPRING, TENSION            |         | 70   | 7-685-647-14  | SCREW +BVTP 3X10 TYPE2 N-S      |         |
| 57  | *X-3325-501-1 | CHASSIS ASSY, JOINT        |         | 71   | *3-319-722-01 | BRACLET, MD                     |         |
| 58  | 7-685-133-19  | SCREW +BTP 2.6X6 TYPE2 N-S |         | 72   | 9-911-841-XX  | CUSHION                         |         |
| 59  | *3-309-132-12 | CHASSIS                    |         | 73   | *2-056-665-00 | HOLDER, WIRE (PURSE LOCK 5 DIA) |         |
| 60  | 7-685-871-01  | SCREW +BVTT 3X6 (S)        |         | 74   | *2-056-666-00 | PURSE LOCK (8 DIA.)             |         |
| 61  | 7-628-254-05  | SCREW +PS 2.6X5            |         | 901  | 1-548-563-91  | COUNTER, TAPE (MIDDLE TYPE)     |         |
| 62  | 3-318-825-01  | PULLEY, MIDWAY             |         | 902  | *A-2056-296-A | MONTEED PCB, AUDIO              |         |
| 63  | 3-558-708-21  | WASHER, STOPPER            |         | Q312 | 8-729-154-82  | TRANSISTOR 2SB548-R             |         |
| 64  | 4-812-134-11  | RIVET NYLON, 3.5           |         | Q401 | 8-729-180-92  | TRANSISTOR 2SD809-K             |         |
| 65  | 3-325-509-01  | BELT (A), SQUARE           |         | Q418 | 8-729-180-92  | TRANSISTOR 2SD809-K             |         |

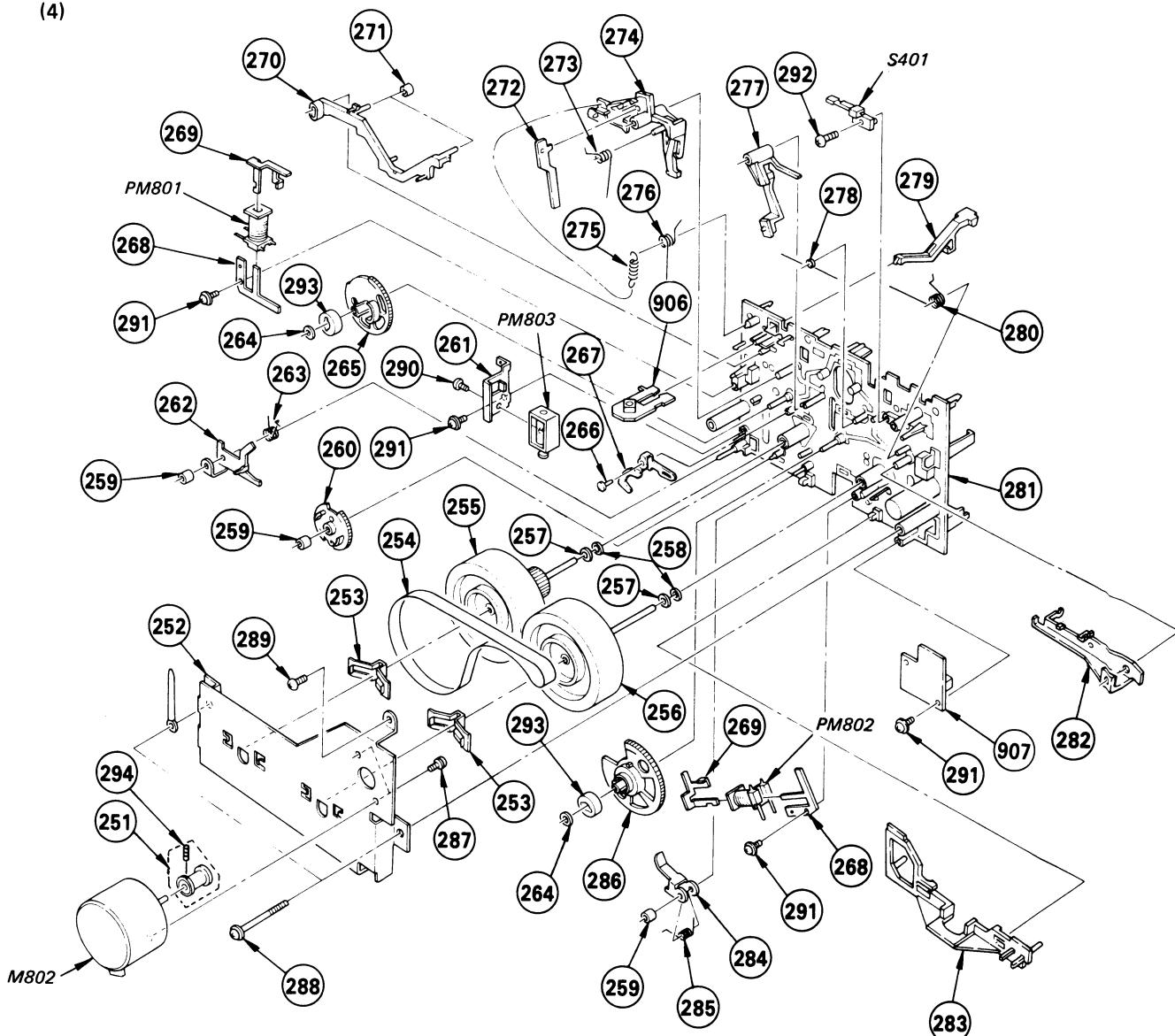
## **FH-150R** **TC-177R**



| No. | Part No.      | Description                | Remarks | No.  | Part No.      | Description                     | Remarks |
|-----|---------------|----------------------------|---------|------|---------------|---------------------------------|---------|
| 51  | *3-312-615-31 | HEAT SINK                  |         | 66   | 7-621-775-10  | SCREW +B 2.6X4                  |         |
| 53  | *3-325-515-01 | PLATE, SHIELD              |         | 67   | 3-572-365-11  | SHEET, INSULATING (A)           |         |
| 54  | *3-325-513-01 | SLIDER, EJECT              |         | 68   | 3-703-249-01  | SCREW, S TIGHT, +PTTWH 3X6      |         |
| 55  | *3-575-502-00 | BRACKET, EJECT             |         | 69   | 3-309-129-71  | PLATE, JACK                     |         |
| 56  | 3-534-238-XX  | SPRING, TENSION            |         | 70   | 7-685-647-14  | SCREW +BVTP 3X10 TYPE2 N-S      |         |
| 57  | *X-3325-501-1 | CHASSIS ASSY, JOINT        |         | 71   | *3-319-722-01 | BRACLET, MD                     |         |
| 58  | 7-685-133-19  | SCREW +BTP 2.6X6 TYPE2 N-S |         | 72   | 9-911-841-XX  | CUSHION                         |         |
| 59  | *3-309-132-12 | CHASSIS                    |         | 73   | *2-056-665-00 | HOLDER, WIRE (PURCE LOCK 5 DIA) |         |
| 60  | 7-685-871-01  | SCREW +BVTT 3X6 (S)        |         | 74   | *2-056-666-00 | PURSE LOCK (8 DIA.)             |         |
| 61  | 7-628-254-05  | SCREW +PS 2.6X5            |         | 901  | 1-548-563-91  | COUNTER, TAPE (MIDDLE TYPE)     |         |
| 62  | 3-318-825-01  | PULLEY, MIDWAY             |         | 902  | *A-2056-296-A | MOUNTED PCB, AUDIO              |         |
| 63  | 3-558-708-21  | WASHER, STOPPER            |         | Q312 | 8-729-154-82  | TRANSISTOR 2SB548-R             |         |
| 64  | 4-812-134-11  | RIVET NYLON, 3.5           |         | Q401 | 8-729-180-92  | TRANSISTOR 2SD809-K             |         |
| 65  | 3-325-509-01  | BELT (A), SQUARE           |         | Q418 | 8-729-180-92  | TRANSISTOR 2SD809-K             |         |

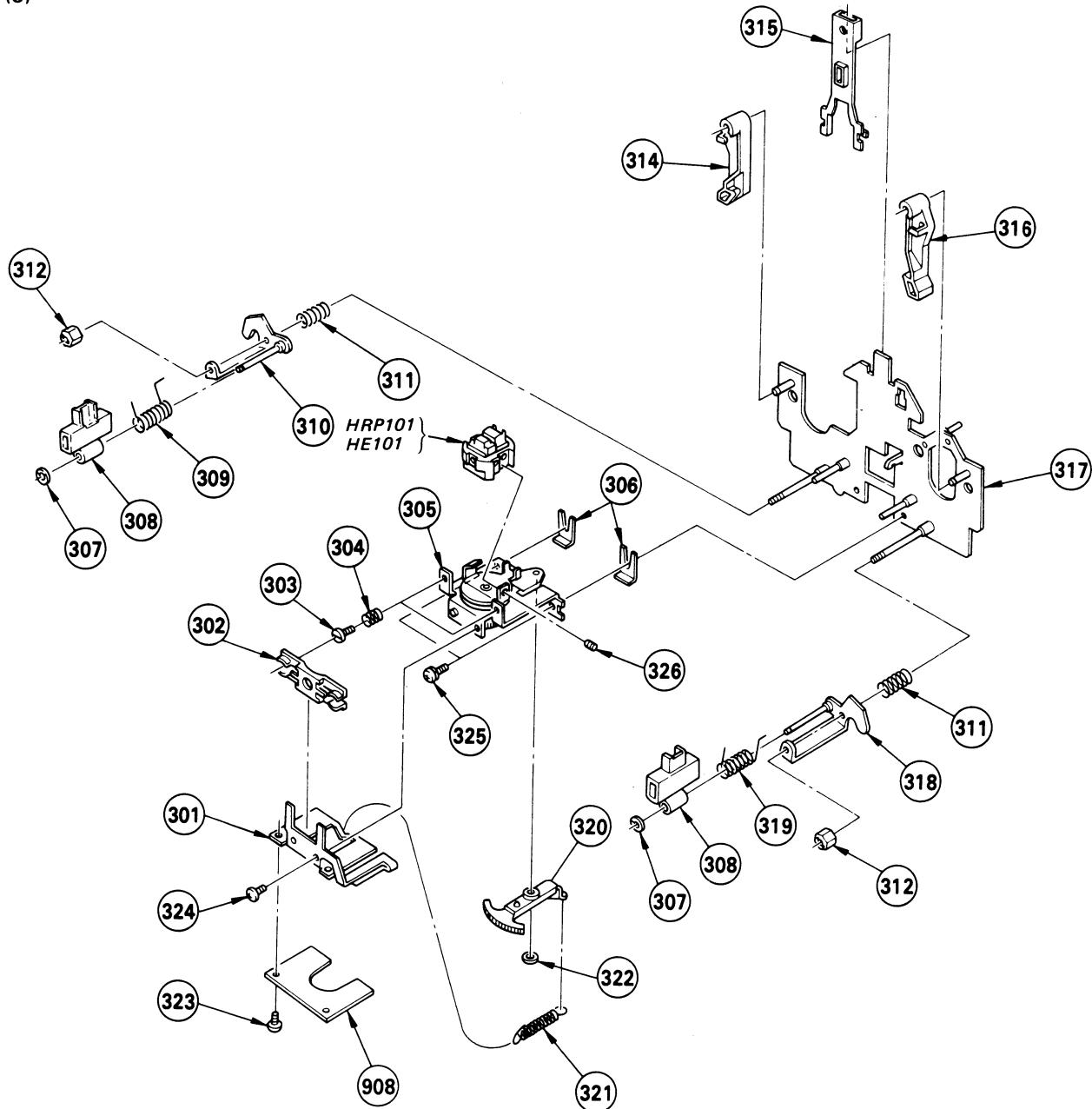
| No. | Part No.      | Description                | Remarks | No. | Part No.      | Description                 | Remarks      |
|-----|---------------|----------------------------|---------|-----|---------------|-----------------------------|--------------|
| 201 | 7-685-865-01  | SCREW +BVTT 2.6X12 (S)     |         | 224 | 3-307-394-00  | RETAINER (B), THRUST        |              |
| 202 | 3-575-332-00  | GEAR, FR                   |         | 225 | 3-575-324-00  | GEAR, LIMITER               |              |
| 203 | 3-319-721-01  | SPRING, COMPRESSION        |         | 226 | 3-564-027-11  | FELT, LIMITER               |              |
| 204 | 3-319-700-01  | HOLDER, CASSETTE           |         | 227 | 3-575-304-00  | SHAFT, GEAR, FR             |              |
| 205 | 3-319-613-01  | PISTON (B)                 |         | 228 | X-3319-612-1  | MOTOR ASSY, REEL            | 202, 224-227 |
| 206 | 3-312-441-00  | RING, PISTON               |         | 229 | 3-575-457-00  | PLATE (B), SHIELD, MOTOR    |              |
| 207 | 3-313-292-11  | RETAINER, CASSETTE         |         | 230 | *3-319-615-01 | LEVER (RIGHT), BACK TENSION |              |
| 208 | 3-319-607-01  | BUSHING, REEL TABLE        |         | 231 | 3-319-650-01  | SPRING (R)                  |              |
| 209 | 3-319-657-01  | PULLEY (B) CB              |         | 232 | *3-319-652-01 | PLATE (RIGHT), LIMITER      |              |
| 210 | 3-325-510-01  | BELT (B), SQUARE           |         | 233 | X-3319-607-1  | PINCH LEVER ASSY            |              |
| 211 | X-3319-617-1  | PULLEY ASSY, MOTOR         |         | 234 | 3-319-686-01  | SPRING, TENSION             |              |
| 212 | 3-319-614-01  | SPRING                     |         | 235 | 3-319-685-01  | SPRING, TENSION             |              |
| 213 | 3-319-694-01  | SPRING, TENSION            |         | 236 | 3-319-601-01  | SPRING                      |              |
| 214 | 3-575-346-01  | FELT, BREKE                |         | 237 | *3-319-653-01 | PLATE (LEFT), LIMITER       |              |
| 215 | *3-319-611-01 | LEVER (LEFT), BACK TENSION |         | 238 | 3-319-651-01  | SPRING (L)                  |              |
| 216 | 3-319-670-01  | HOLDER, SWITCH, DETECTION  |         | 239 | 7-671-112-01  | STEEL, BALL                 |              |
| 217 | 3-319-605-01  | LEVER, METAL DETECTION     |         | 240 | 7-621-775-60  | SCREW +B 2.6X12             |              |
| 218 | 3-319-603-01  | LEVER, REC DETECTION       |         | 241 | 7-671-112-11  | BALL, STEEL                 |              |
| 219 | 3-319-604-01  | LEVER, HALF DETECTION      |         | 242 | 7-685-102-21  | SCREW +PTP 2.6X4 TYPE2 SLIT |              |
| 220 | 3-319-602-01  | SPRING                     |         | 243 | 7-688-002-01  | W 2.6, SMALL                |              |
| 221 | 3-319-669-01  | LEVER, EJECT               |         | 904 | *1-614-696-11 | PC BOARD, DETECTION SW      |              |
| 222 | 3-312-432-00  | SPRING, TENSION            |         | 905 | *1-613-522-11 | PC BOARD, TRANSLATION       |              |
| 223 | *3-319-678-01 | LEVER, SWITCH LIFT         |         |     |               |                             |              |

(4)



| No. | Part No.      | Description             | REMARKS | No. | Part No.      | Description                     | REMARKS |
|-----|---------------|-------------------------|---------|-----|---------------|---------------------------------|---------|
| 251 | X-3319-617-1  | PULLEY ASSY, MOTOR      |         | 294 | *X-3319-614-1 | LEVER ASSY, PAUSE               |         |
| 252 | *3-319-665-01 | RETAINER, THRUST        |         | 275 | 3-555-124-00  | SPRING, TENSION                 |         |
| 253 | 3-319-608-01  | RETAINER, THRUST        |         | 276 | 3-319-637-01  | SPRING (R)                      |         |
| 254 | 3-319-630-01  | BELT (R), CAPSTAN       |         | 277 | *X-3319-615-1 | LEVER ASSY, FWD LOCK            |         |
| 255 | X-3319-606-1  | FLYWHEEL (T) ASSY       |         | 278 | 3-319-649-01  | SPRING                          |         |
| 256 | X-3319-601-1  | FLYWHEEL ASSY           |         | 279 | 3-319-666-01  | LEVER (RIGHT), REC DETECTION    |         |
| 257 | 3-701-438-11  | WASHER, 2.5             |         | 280 | 3-319-633-01  | SPRING                          |         |
| 258 | 3-307-482-00  | WASHER, LUMILER         |         | 281 | X-3319-611-1  | CHASSIS ASSY, MECHANICAL        |         |
| 259 | 3-319-607-01  | BUSHING, REEL TABLE     |         | 282 | *3-319-676-01 | LEVER, FWD                      |         |
| 260 | 3-319-674-01  | GEAR, REVERSE CAM       |         | 283 | *3-319-681-01 | SLIDER, REVERSE                 |         |
| 261 | *3-319-639-01 | BRACKET, TRIGGER PM     |         | 284 | *3-319-658-01 | LEVER, TRIGGER KICK             |         |
| 262 | *3-319-628-01 | LEVER, REVERSE TRIGGER  |         | 285 | 3-319-660-01  | SPRING                          |         |
| 263 | 3-319-648-01  | SPRING                  |         | 286 | 3-319-689-01  | GEAR, FWD CAM                   |         |
| 264 | 3-307-394-00  | RETAINER (B), THRUST    |         | 287 | 7-628-253-95  | SCREW +PS 2.6X4                 |         |
| 265 | 3-319-688-01  | GEAR, PAUSE CAM         |         | 288 | 7-685-879-01  | SCREW +BVTT 3X30 (S)            |         |
| 266 | *3-319-664-01 | SHAFT, CONTROL LEVER    |         | 289 | 7-685-646-21  | SCREW +BVTP 3X8 (S)             |         |
| 267 | *3-319-683-01 | LEVER, CONTROL, TRIGGER |         | 290 | 7-685-850-01  | SCREW +BVTT 2X3 (S)             |         |
| 268 | 3-307-332-00  | ARBOR, FIXED            |         | 291 | 7-687-204-11  | TOTSU PTPWH 2X6 NON-SLIT, TYPE2 |         |
| 269 | 3-307-333-00  | ARBOR, TRIGGER          |         | 292 | 7-685-792-01  | SCREW +PTT 2.6X5                |         |
| 270 | *3-319-668-01 | PLATE, BRAKE            |         | 293 | 1-452-202-00  | MAGNET                          |         |
| 271 | 3-319-662-01  | RUBBER, BRAKE           |         | 294 | 7-621-733-08  | SET-SCT, HEX 2X4 FLAT POINT     |         |
| 272 | 3-319-612-01  | SPRING                  |         | 906 | *1-612-727-11 | PC BOARD, REC DET               |         |
| 273 | 3-319-606-01  | SPRING                  |         | 907 | *1-614-396-11 | PC BOARD, SLIDE SW              |         |

(5)



| No. | Part No.      | Description                 | REMARKS | No. | Part No.      | Description                    | REMARKS |
|-----|---------------|-----------------------------|---------|-----|---------------|--------------------------------|---------|
| 301 | 3-319-620-01  | PLATE, ORNAMENTAL, HEAD     |         | 312 | 3-319-638-01  | NUT, ADJUSTMENT                |         |
| 302 | 3-319-644-01  | STOPPER                     |         | 314 | 3-319-643-01  | LEVER (L), P ROLLER SELECTION  |         |
| 303 | 3-319-663-01  | SCREW, ADJUSTMENT, AZIMUTH  |         | 315 | 3-319-684-01  | PROTECTOR, EDGE                |         |
| 304 | 3-307-460-00  | SPRING, COMPRESSION         |         | 316 | 3-319-642-01  | LEVER (R), P ROLLER SELECTION  |         |
| 305 | X-3319-613-1  | BRACKET COMPLETE ASSY, HEAD |         | 317 | *X-3319-610-1 | CHASSIS ASSY, REVERSE HEAD     |         |
| 306 | 3-307-477-01  | SEAM (A), HEAD ADJUSTMENT   |         | 318 | *X-3319-608-1 | LEVER (RIGHT) ASSY, GUIDE      |         |
|     | 3-307-477-11  | SEAM (A), HEAD ADJUSTMENT   |         | 319 | 3-306-250-00  | SPRING (RIGHT)                 |         |
|     | 3-307-477-21  | SEAM (A), HEAD ADJUSTMENT   |         | 320 | 3-319-625-01  | GEAR, ROTARY HEAD              |         |
|     | 3-307-477-31  | SEAM (A), HEAD ADJUSTMENT   |         | 321 | 3-306-258-01  | SPRING, TENSION                |         |
|     | 3-307-477-41  | SEAM (A), HEAD ADJUSTMENT   |         | 322 | 7-624-102-04  | STOP RING 1.5                  |         |
| 307 | 3-307-394-00  | RETAINER (B), THRUST        |         | 323 | 7-685-850-01  | SCREW +BVTT 2X3 (S)            |         |
| 308 | 3-306-269-01  | GUIDE, TAPE                 |         | 324 | 7-627-553-17  | SCREW, PRECISION +P 2X2        |         |
| 309 | 3-306-249-00  | SPRING (LEFT)               |         | 325 | 7-628-253-05  | SCREW +PS 2X4                  |         |
| 310 | *X-3319-609-1 | LEVER (LEFT) ASSY, GUIDE    |         | 326 | 7-621-710-26  | SET-SCREW, SLOT 2X3 FLAT POINT |         |
| 311 | 3-537-215-00  | SPRING, COMPRESSION         |         | 908 | *1-612-729-11 | PC BOARD, HEAD TRANSLATION     |         |

## SECTION 6

### ELECTRICAL PARTS LIST

#### NOTE:

- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

#### CAPACITORS:

MF:  $\mu$ F, PF:  $\mu\mu$ F.

#### RESISTORS

- All resistors are in ohms.
- F : nonflammable

#### COILS

MMH : mH, UH :  $\mu$ H

#### SEMICONDUCTORS

In each case, U :  $\mu$ , for example:  
 UA... :  $\mu$ A..., UPA... :  $\mu$ PA..., UPC... :  $\mu$ PC,  
 UPD... :  $\mu$ PD...

The components identified by shading and mark are critical for safety. Replace only with part number specified.

#### ELECTRICAL PARTS

| Ref.No. | Part No.      | Description                 |          |     |      |  |
|---------|---------------|-----------------------------|----------|-----|------|--|
| 901     | 1-548-563-91  | COUNTER, TAPE (MIDDLE TYPE) |          |     |      |  |
| 902     | *A-2056-296-A | MAINTAINED PCB, AUDIO       |          |     |      |  |
| 903     | *1-615-390-11 | PC BOARD, CONTROL SWITCH    |          |     |      |  |
| 904     | *1-614-696-11 | PC BOARD, DETECTION SW      |          |     |      |  |
| 905     | *1-613-522-11 | PC BOARD, TRANSLATION       |          |     |      |  |
| 906     | *1-612-727-11 | PC BOARD, REC DET           |          |     |      |  |
| 907     | *1-614-396-11 | PC BOARD, SLIDE SW          |          |     |      |  |
| 908     | *1-612-729-11 | PC BOARD, HEAD TRANSLATION  |          |     |      |  |
| C101    | 1-162-293-31  | CERAMIC                     | 820PF    | 10% | 50V  |  |
| C102    | 1-123-384-00  | ELECT                       | 10MF     | 20% | 50V  |  |
| C103    | 1-136-157-00  | FILM                        | 0.022MF  | 5%  | 50V  |  |
| C104    | 1-123-307-00  | ELECT                       | 100MF    | 20% | 10V  |  |
| C105    | 1-123-613-00  | ELECT                       | 3.3MF    | 20% | 50V  |  |
| C106    | 1-136-157-00  | FILM                        | 0.022MF  | 5%  | 50V  |  |
| C107    | 1-136-158-00  | FILM                        | 0.027MF  | 5%  | 50V  |  |
| C108    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C109    | 1-162-294-31  | CERAMIC                     | 0.001MF  | 10% | 50V  |  |
| C110    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C111    | 1-123-328-00  | ELECT                       | 100MF    | 20% | 10V  |  |
| C112    | 1-162-199-31  | CERAMIC                     | 10PF     | 5%  | 50V  |  |
| C113    | 1-123-356-00  | ELECT                       | 10MF     | 20% | 16V  |  |
| C114    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C115    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C116    | 1-110-201-00  | MYLAR                       | 0.0033MF | 5%  | 50V  |  |
| C117    | 1-123-298-00  | ELECT                       | 470MF    | 20% | 6.3V |  |
| C118    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C119    | 1-110-203-00  | MYLAR                       | 0.0047MF | 5%  | 50V  |  |
| C120    | 1-136-173-00  | FILM                        | 0.47MF   | 5%  | 50V  |  |
| C121    | 1-136-167-00  | FILM                        | 0.15MF   | 5%  | 50V  |  |
| C122    | 1-136-155-00  | FILM                        | 0.015MF  | 5%  | 50V  |  |
| C123    | 1-136-169-00  | FILM                        | 0.22MF   | 5%  | 50V  |  |
| C124    | 1-136-163-00  | FILM                        | 0.068MF  | 5%  | 50V  |  |
| C125    | 1-136-161-00  | FILM                        | 0.047MF  | 5%  | 50V  |  |
| C126    | 1-110-205-00  | MYLAR                       | 0.0068MF | 5%  | 50V  |  |
| C127    | 1-136-153-00  | FILM                        | 0.01MF   | 5%  | 50V  |  |
| C128    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C129    | 1-123-382-00  | ELECT                       | 3.3MF    | 20% | 50V  |  |
| C131    | 1-136-162-00  | FILM                        | 0.056MF  | 5%  | 50V  |  |
| C132    | 1-123-318-00  | ELECT                       | 33MF     | 20% | 10V  |  |
| C133    | 1-136-153-00  | FILM                        | 0.01MF   | 5%  | 50V  |  |
| C134    | 1-110-200-00  | MYLAR                       | 0.0027MF | 5%  | 50V  |  |
| C135    | 1-136-157-00  | FILM                        | 0.022MF  | 5%  | 50V  |  |
| C136    | 1-110-205-00  | MYLAR                       | 0.0068MF | 5%  | 50V  |  |
| C138    | 1-123-369-00  | ELECT                       | 4.7MF    | 20% | 25V  |  |
| C140    | 1-136-272-00  | FILM                        | 68PF     | 5%  | 630V |  |
| C141    | 1-136-271-00  | FILM                        | 56PF     | 5%  | 630V |  |
| C201    | 1-162-293-31  | CERAMIC                     | 820PF    | 10% | 50V  |  |

#### ELECTRICAL PARTS

| Ref.No. | Part No.     | Description |          |     |      |  |
|---------|--------------|-------------|----------|-----|------|--|
| C202    | 1-123-384-00 | ELECT       | 10MF     | 20% | 50V  |  |
| C203    | 1-136-157-00 | FILM        | 0.022MF  | 5%  | 50V  |  |
| C204    | 1-123-307-00 | ELECT       | 100MF    | 20% | 10V  |  |
| C205    | 1-123-613-00 | ELECT       | 3.3MF    | 20% | 50V  |  |
| C206    | 1-136-157-00 | FILM        | 0.022MF  | 5%  | 50V  |  |
| C207    | 1-136-158-00 | FILM        | 0.027MF  | 5%  | 50V  |  |
| C208    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C209    | 1-162-294-31 | CERAMIC     | 0.001MF  | 10% | 50V  |  |
| C210    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C211    | 1-123-307-00 | ELECT       | 100MF    | 20% | 10V  |  |
| C212    | 1-162-199-31 | CERAMIC     | 10PF     | 5%  | 50V  |  |
| C213    | 1-123-356-00 | ELECT       | 10MF     | 20% | 16V  |  |
| C214    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C215    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C216    | 1-110-201-00 | MYLAR       | 0.0033MF | 5%  | 50V  |  |
| C217    | 1-123-298-00 | ELECT       | 470MF    | 20% | 6.3V |  |
| C218    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C219    | 1-110-203-00 | MYLAR       | 0.0047MF | 5%  | 50V  |  |
| C220    | 1-136-173-00 | FILM        | 0.47MF   | 5%  | 50V  |  |
| C221    | 1-136-167-00 | FILM        | 0.15MF   | 5%  | 50V  |  |
| C222    | 1-136-155-00 | FILM        | 0.015MF  | 5%  | 50V  |  |
| C223    | 1-136-169-00 | FILM        | 0.22MF   | 5%  | 50V  |  |
| C224    | 1-136-163-00 | FILM        | 0.068MF  | 5%  | 50V  |  |
| C225    | 1-136-161-00 | FILM        | 0.047MF  | 5%  | 50V  |  |
| C226    | 1-110-205-00 | MYLAR       | 0.0068MF | 5%  | 50V  |  |
| C227    | 1-136-153-00 | FILM        | 0.01MF   | 5%  | 50V  |  |
| C228    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C229    | 1-123-382-00 | ELECT       | 3.3MF    | 20% | 50V  |  |
| C231    | 1-136-162-00 | FILM        | 0.056MF  | 5%  | 50V  |  |
| C232    | 1-123-318-00 | ELECT       | 33MF     | 20% | 10V  |  |
| C233    | 1-136-153-00 | FILM        | 0.01MF   | 5%  | 50V  |  |
| C234    | 1-110-200-00 | MYLAR       | 0.0027MF | 5%  | 50V  |  |
| C235    | 1-136-157-00 | FILM        | 0.022MF  | 5%  | 50V  |  |
| C236    | 1-110-205-00 | MYLAR       | 0.0068MF | 5%  | 50V  |  |
| C238    | 1-123-369-00 | ELECT       | 4.7MF    | 20% | 25V  |  |
| C240    | 1-136-272-00 | FILM        | 68PF     | 5%  | 630V |  |
| C241    | 1-136-271-00 | FILM        | 56PF     | 5%  | 630V |  |
| C301    | 1-123-308-00 | ELECT       | 220MF    | 20% | 10V  |  |
| C302    | 1-123-382-00 | ELECT       | 3.3MF    | 20% | 50V  |  |
| C303    | 1-123-306-00 | ELECT       | 47MF     | 20% | 10V  |  |
| C304    | 1-123-306-00 | ELECT       | 47MF     | 20% | 10V  |  |
| C305    | 1-123-308-00 | ELECT       | 220MF    | 20% | 10V  |  |
| C306    | 1-123-321-00 | ELECT       | 220MF    | 20% | 16V  |  |
| C307    | 1-123-381-00 | ELECT       | 2.2MF    | 20% | 50V  |  |
| C308    | 1-123-356-00 | ELECT       | 10MF     | 20% | 16V  |  |

ELECTRICAL PARTS

| Ref.No. | Part No.      | Description           | 10MF     | 20% | 16V  |
|---------|---------------|-----------------------|----------|-----|------|
| C309    | 1-123-356-00  | ELECT                 | 0.47MF   | 20% | 50V  |
| C311    | 1-123-379-00  | ELECT                 | 10MF     | 20% | 16V  |
| C312    | 1-123-356-00  | ELECT                 | 0.0047MF | 5%  | 100V |
| C313    | 1-130-289-00  | FILM                  | 0.0047MF | 5%  | 100V |
| C314    | 1-130-289-00  | FILM                  | 0.0082MF | 5%  | 100V |
| C315    | 1-130-295-00  | FILM                  | 0.0082MF | 5%  | 100V |
| C316    | 1-129-713-00  | FILM                  | 0.0082MF | 10% | 630V |
| C317    | 1-129-898-00  | FILM                  | 0.0022MF | 10% | 630V |
| C318    | 1-129-705-00  | FILM                  | 0.0018MF | 10% | 630V |
| C319    | 1-123-321-00  | ELECT                 | 220MF    | 20% | 16V  |
| C320    | 1-123-332-00  | ELECT                 | 47MF     | 20% | 16V  |
| C321    | 1-123-318-00  | ELECT                 | 33MF     | 20% | 10V  |
| C401    | 1-123-333-00  | ELECT                 | 100MF    | 20% | 16V  |
| C402    | 1-123-321-00  | ELECT                 | 220MF    | 20% | 16V  |
| C403    | 1-123-306-00  | ELECT                 | 47MF     | 20% | 10V  |
| C404    | 1-123-298-00  | ELECT                 | 470MF    | 20% | 6.3V |
| C405    | 1-162-304-31  | CERAMIC               | 0.0047MF | 20% | 16V  |
| C406    | 1-110-206-00  | MYLAR                 | 0.0082MF | 5%  | 50V  |
| C407    | 1-123-381-00  | ELECT                 | 2.2MF    | 20% | 50V  |
| C408    | 1-123-356-00  | ELECT                 | 10MF     | 20% | 16V  |
| C409    | 1-123-611-00  | ELECT                 | 1MF      | 20% | 50V  |
| C410    | 1-123-380-00  | ELECT                 | 1MF      | 20% | 50V  |
| C411    | 1-123-307-00  | ELECT                 | 100MF    | 20% | 10V  |
| C412    | 1-123-321-00  | ELECT                 | 220MF    | 20% | 16V  |
| C413    | 1-123-380-00  | ELECT                 | 1MF      | 20% | 50V  |
| C414    | 1-123-380-00  | ELECT                 | 1MF      | 20% | 50V  |
| C415    | 1-123-308-00  | ELECT                 | 220MF    | 20% | 10V  |
| C416    | 1-123-381-00  | ELECT                 | 2.2MF    | 20% | 50V  |
| C417    | 1-161-494-00  | CERAMIC               | 0.022MF  | 30% | 25V  |
| C501    | 1-123-381-00  | ELECT                 | 2.2MF    | 20% | 50V  |
| C502    | 1-162-284-31  | CERAMIC               | 150PF    | 10% | 50V  |
| C503    | 1-162-284-31  | CERAMIC               | 150PF    | 10% | 50V  |
| C504    | 1-123-356-00  | ELECT                 | 10MF     | 20% | 16V  |
| C505    | 1-162-282-31  | CERAMIC               | 100PF    | 10% | 50V  |
| C601    | 1-161-494-00  | CERAMIC               | 0.022MF  | 30% | 25V  |
| CN1     | 1-562-068-13  | SOCKET, CONNECTOR 13P |          |     |      |
| CN301   | *1-564-509-11 | PLUG, CONNECTOR 6P    |          |     |      |
| CN302   | *1-564-505-11 | PLUG, CONNECTOR 2P    |          |     |      |
| CN303   | *1-564-505-11 | PLUG, CONNECTOR 2P    |          |     |      |
| CN401   | *1-564-508-11 | PLUG, CONNECTOR 5P    |          |     |      |
| CN402   | *1-564-508-11 | PLUG, CONNECTOR 5P    |          |     |      |
| CN403   | *1-564-508-11 | PLUG, CONNECTOR 5P    |          |     |      |
| CN801   | *1-564-336-00 | PIN, CONNECTOR 2P     |          |     |      |
| CN802   | *1-564-338-00 | PIN, CONNECTOR 4P     |          |     |      |
| CN803   | *1-564-339-00 | PIN, CONNECTOR 5P     |          |     |      |
| CN805   | *1-564-341-11 | PIN, CONNECTOR 7P     |          |     |      |
| CT301   | 1-141-225-00  | CAP, TUNING, TRIMAR   |          |     |      |
| D101    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |
| D102    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |
| D201    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |
| D202    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |
| D301    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |
| D302    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |
| D303    | 8-719-107-94  | DIODE 1SS202-1        |          |     |      |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description                 | 8-719-107-94   | DIODE 1SS202-1  |
|---------|--------------|-----------------------------|----------------|-----------------|
| D304    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D305    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-910-11   | DIODE HZ11A1L   |
| D306    | 8-719-910-11 | DIODE HZ11A1L               | 8-719-107-94   | DIODE 1SS202-1  |
| D307    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D308    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D309    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D310    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE HZ11C2L   |
| D401    | 8-719-910-18 | DIODE HZ11C2L               | 8-719-910-64   | DIODE HZ6B1L    |
| D402    | 8-719-910-64 | DIODE HZ6B1L                | 8-719-107-94   | DIODE 1SS202-1  |
| D403    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D404    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D405    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D406    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D407    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D408    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D409    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D410    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D411    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D412    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D413    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D414    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D415    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D417    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-107-94   | DIODE 1SS202-1  |
| D501    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-920-03   | DIODE GL-8PG1   |
| D502    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-920-03   | DIODE GL-8PG1   |
| D503    | 8-719-107-94 | DIODE 1SS202-1              | 8-719-920-03   | DIODE GL-8PG1   |
| D601    | 8-719-920-03 | DIODE GL-8PG1               | 8-719-918-65   | DIODE GL-1PR102 |
| D602    | 8-719-920-03 | DIODE GL-8PG1               | 8-719-918-66   | DIODE GL-1HY102 |
| D603    | 8-719-920-03 | DIODE GL-8PG1               | 8-719-918-67   | DIODE GL-1EG102 |
| D604    | 8-719-918-65 | DIODE GL-1PR102             | 8-719-107-94   | DIODE 1SS202-1  |
| D605    | 8-719-918-66 | DIODE GL-1HY102             | X-3319-616-1   | HEAD UNIT ASSY  |
| D606    | 8-719-918-67 | DIODE GL-1EG102             | X-3319-616-1   | HEAD UNIT ASSY  |
| L101    | 1-408-923-00 | MICRO INDUCTOR 8.2MMH       | IC LA3160      |                 |
| L104    | 1-408-930-00 | MICRO INDUCTOR 33MMH        | IC LA3220      |                 |
| L201    | 1-408-923-00 | MICRO INDUCTOR 8.2MMH       | IC CX20187     |                 |
| L204    | 1-408-930-00 | MICRO INDUCTOR 33MMH        | IC NJM4558S    |                 |
| L301    | 1-408-096-00 | MICRO INDUCTOR 470UH        | IC TC9312N-001 |                 |
| L501    | 1-408-579-00 | MICRO INDUCTOR 220UH        | IC CX10034     |                 |
| M802    | 1-541-239-00 | MOTOR (CAPSTAIN)            | IC M50761-417P |                 |
| PHI401  | 8-719-902-90 | PHOTO INTERRUPTOR SPI201-20 |                |                 |
| Q101    | 8-729-900-89 | TRANSISTOR DTC144ES         |                |                 |
| Q102    | 8-729-102-03 | TRANSISTOR 2SD1020          |                |                 |
| Q103    | 8-729-606-33 | TRANSISTOR 2SC2603F         |                |                 |

ELECTRICAL PARTS

| Ref. No. | Part No.     | Description              |
|----------|--------------|--------------------------|
| Q104     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q105     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q106     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q201     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q202     | 8-729-102-03 | TRANSISTOR 2SD1020       |
| Q203     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q204     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q205     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q206     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q301     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q302     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q303     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q304     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q305     | 8-729-117-54 | TRANSISTOR 2SA1175       |
| Q306     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q309     | 8-729-801-93 | TRANSISTOR 2SD1387       |
| Q310     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q311     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q312     | 8-729-154-82 | TRANSISTOR 2SB548-R      |
| Q313     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q314     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| Q315     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q401     | 8-729-180-92 | TRANSISTOR 2SD809-K      |
| Q404     | 8-729-180-92 | TRANSISTOR 2SD809-K      |
| Q405     | 8-729-117-54 | TRANSISTOR 2SA1175       |
| Q406     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q407     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q408     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q409     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q410     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q411     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q412     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q413     | 8-729-900-80 | TRANSISTOR DTA114ES      |
| Q414     | 8-729-801-93 | TRANSISTOR 2SD1387       |
| Q415     | 8-729-801-93 | TRANSISTOR 2SD1387       |
| Q416     | 8-729-801-83 | TRANSISTOR 2SB1013       |
| Q417     | 8-729-801-83 | TRANSISTOR 2SB1013       |
| Q418     | 8-729-180-92 | TRANSISTOR 2SD809-K      |
| Q419     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q420     | 8-729-801-93 | TRANSISTOR 2SD1387       |
| Q421     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q422     | 8-729-900-89 | TRANSISTOR DTC144ES      |
| Q423     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q424     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q425     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q426     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q501     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q502     | 8-729-900-65 | TRANSISTOR DTA144ES      |
| Q601     | 8-729-606-33 | TRANSISTOR 2SC2603F      |
| R101     | 1-249-434-11 | CARBON      27K 5% 1/6W  |
| R102     | 1-247-883-00 | CARBON      150K 5% 1/6W |
| R103     | 1-249-425-11 | CARBON      4.7K 5% 1/6W |
| R104     | 1-247-808-00 | CARBON      110 5% 1/6W  |
| R105     | 1-249-421-11 | CARBON      2.2K 5% 1/6W |
| R106     | 1-249-421-11 | CARBON      2.2K 5% 1/6W |
| R107     | 1-247-841-00 | CARBON      2.7K 5% 1/6W |
| R108     | 1-247-887-00 | CARBON      220K 5% 1/6W |
| R109     | 1-247-823-00 | CARBON      470 5% 1/6W  |

ELECTRICAL PARTS

| Ref. No. | Part No.     | Description | Value | Tolerance | Power Rating |
|----------|--------------|-------------|-------|-----------|--------------|
| R110     | 1-249-437-11 | CARBON      | 47K   | 5%        | 1/6W         |
| R111     | 1-247-829-00 | CARBON      | 820   | 5%        | 1/6W         |
| R112     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R113     | 1-247-859-00 | CARBON      | 15K   | 5%        | 1/6W         |
| R114     | 1-247-815-00 | CARBON      | 220   | 5%        | 1/6W         |
| R115     | 1-247-827-00 | CARBON      | 680   | 5%        | 1/6W         |
| R116     | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W         |
| R117     | 1-249-419-11 | CARBON      | 1.5K  | 5%        | 1/6W         |
| R118     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R119     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R120     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R121     | 1-247-846-00 | CARBON      | 4.3K  | 5%        | 1/6W         |
| R122     | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W         |
| R123     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R124     | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W         |
| R125     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R126     | 1-247-822-00 | CARBON      | 430   | 5%        | 1/6W         |
| R127     | 1-247-851-00 | CARBON      | 6.8K  | 5%        | 1/6W         |
| R128     | 1-247-827-00 | CARBON      | 680   | 5%        | 1/6W         |
| R129     | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W         |
| R130     | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W         |
| R131     | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W         |
| R132     | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W         |
| R133     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R134     | 1-247-867-00 | CARBON      | 33K   | 5%        | 1/6W         |
| R135     | 1-247-867-00 | CARBON      | 33K   | 5%        | 1/6W         |
| R136     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R138     | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W         |
| R139     | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W         |
| R140     | 1-247-849-00 | CARBON      | 5.6K  | 5%        | 1/6W         |
| R141     | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W         |
| R142     | 1-247-845-00 | CARBON      | 3.9K  | 5%        | 1/6W         |
| R143     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R144     | 1-247-845-00 | CARBON      | 3.9K  | 5%        | 1/6W         |
| R145     | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W         |
| R146     | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W         |
| R201     | 1-249-434-11 | CARBON      | 27K   | 5%        | 1/6W         |
| R202     | 1-247-883-00 | CARBON      | 150K  | 5%        | 1/6W         |
| R203     | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W         |
| R204     | 1-247-808-00 | CARBON      | 110   | 5%        | 1/6W         |
| R205     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R206     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R207     | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W         |
| R208     | 1-247-887-00 | CARBON      | 220K  | 5%        | 1/6W         |
| R209     | 1-247-823-00 | CARBON      | 470   | 5%        | 1/6W         |
| R210     | 1-249-437-11 | CARBON      | 47K   | 5%        | 1/6W         |
| R211     | 1-247-829-00 | CARBON      | 820   | 5%        | 1/6W         |
| R212     | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W         |
| R213     | 1-247-859-00 | CARBON      | 15K   | 5%        | 1/6W         |
| R214     | 1-247-815-00 | CARBON      | 220   | 5%        | 1/6W         |
| R215     | 1-247-827-00 | CARBON      | 680   | 5%        | 1/6W         |
| R216     | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W         |
| R217     | 1-249-419-11 | CARBON      | 1.5K  | 5%        | 1/6W         |
| R218     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R219     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R220     | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W         |
| R221     | 1-247-846-00 | CARBON      | 4.3K  | 5%        | 1/6W         |

ELECTRICAL PARTS

| Ref.No. | Part No.     | Description | Value | Tolerance | Power |
|---------|--------------|-------------|-------|-----------|-------|
| R222    | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W  |
| R223    | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W  |
| R224    | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W  |
| R225    | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W  |
| R226    | 1-247-822-00 | CARBON      | 430   | 5%        | 1/6W  |
| R227    | 1-247-851-00 | CARBON      | 6.8K  | 5%        | 1/6W  |
| R228    | 1-247-827-00 | CARBON      | 680   | 5%        | 1/6W  |
| R229    | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W  |
| R230    | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W  |
| R231    | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W  |
| R232    | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W  |
| R233    | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W  |
| R234    | 1-247-867-00 | CARBON      | 33K   | 5%        | 1/6W  |
| R235    | 1-247-867-00 | CARBON      | 33K   | 5%        | 1/6W  |
| R236    | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W  |
| R238    | 1-247-819-00 | CARBON      | 330   | 5%        | 1/6W  |
| R239    | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W  |
| R240    | 1-247-849-00 | CARBON      | 5.6K  | 5%        | 1/6W  |
| R241    | 1-247-841-00 | CARBON      | 2.7K  | 5%        | 1/6W  |
| R242    | 1-247-845-00 | CARBON      | 3.9K  | 5%        | 1/6W  |
| R243    | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W  |
| R244    | 1-247-845-00 | CARBON      | 3.9K  | 5%        | 1/6W  |
| R245    | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W  |
| R246    | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W  |
| R301    | 1-247-224-00 | CARBON      | 220   | 5%        | 1/2W  |
| R302    | 1-249-433-11 | CARBON      | 22K   | 5%        | 1/6W  |
| R303    | 1-247-843-00 | CARBON      | 3.3K  | 5%        | 1/6W  |
| R304    | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W  |
| R305    | 1-247-875-00 | CARBON      | 68K   | 5%        | 1/6W  |
| R306    | 1-247-903-00 | CARBON      | 1M    | 5%        | 1/6W  |
| R307    | 1-247-807-00 | CARBON      | 100   | 5%        | 1/6W  |
| R308    | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W  |
| R309    | 1-247-224-00 | CARBON      | 220   | 5%        | 1/2W  |
| R310    | 1-249-437-11 | CARBON      | 47K   | 5%        | 1/6W  |
| R311    | 1-249-437-11 | CARBON      | 47K   | 5%        | 1/6W  |
| R312    | 1-249-425-11 | CARBON      | 4.7K  | 5%        | 1/6W  |
| R313    | 1-249-437-11 | CARBON      | 47K   | 5%        | 1/6W  |
| R314    | 1-214-777-00 | METAL       | 100K  | 1%        | 1/4W  |
| R315    | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W  |
| R318    | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W  |
| R319    | 1-249-414-11 | CARBON      | 560   | 5%        | 1/6W  |
| R320    | 1-247-844-00 | CARBON      | 3.6K  | 5%        | 1/6W  |
| R321    | 1-247-848-00 | CARBON      | 5.1K  | 5%        | 1/6W  |
| R322    | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W  |
| R323    | 1-247-853-00 | CARBON      | 8.2K  | 5%        | 1/6W  |
| R324    | 1-247-853-00 | CARBON      | 8.2K  | 5%        | 1/6W  |
| R325    | 1-247-080-00 | CARBON      | 5.6   | 5%        | 1/4W  |
| R326    | 1-249-434-11 | CARBON      | 27K   | 5%        | 1/6W  |
| R327    | 1-249-429-11 | CARBON      | 10K   | 5%        | 1/6W  |
| R328    | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W  |
| R329    | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W  |
| R330    | 1-247-831-00 | CARBON      | 1K    | 5%        | 1/6W  |
| R331    | 1-249-421-11 | CARBON      | 2.2K  | 5%        | 1/6W  |
| R332    | 1-247-879-00 | CARBON      | 100K  | 5%        | 1/6W  |
| R401    | 1-247-751-11 | CARBON      | 820   | 5%        | 1/2W  |
| R404    | 1-247-212-00 | CARBON      | 68    | 5%        | 1/2W  |
| R405    | 1-247-212-00 | CARBON      | 68    | 5%        | 1/2W  |

ELECTRICAL PARTS

| Ref.No. | Part No.      | Description      | Value | Tolerance | Power  |
|---------|---------------|------------------|-------|-----------|--------|
| R406    | 1-249-421-11  | CARBON           | 2.2K  | 5%        | 1/6W   |
| R407    | 1-247-867-00  | CARBON           | 33K   | 5%        | 1/6W   |
| R408    | 1-249-425-11  | CARBON           | 4.7K  | 5%        | 1/6W   |
| R409    | 1-247-811-00  | CARBON           | 150   | 5%        | 1/6W   |
| R410    | 1-247-823-00  | CARBON           | 470   | 5%        | 1/6W   |
| R411    | 1-247-815-00  | CARBON           | 220   | 5%        | 1/6W   |
| R412    | 1-247-815-00  | CARBON           | 220   | 5%        | 1/6W   |
| R413    | 1-247-819-00  | CARBON           | 330   | 5%        | 1/6W   |
| R414    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R415    | 1-247-879-00  | CARBON           | 100K  | 5%        | 1/6W   |
| R416    | 1-249-433-11  | CARBON           | 22K   | 5%        | 1/6W   |
| R417    | 1-249-433-11  | CARBON           | 22K   | 5%        | 1/6W   |
| R418    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R419    | 1-249-437-11  | CARBON           | 47K   | 5%        | 1/6W   |
| R420    | 1-249-425-11  | CARBON           | 4.7K  | 5%        | 1/6W   |
| R421    | 1-249-437-11  | CARBON           | 47K   | 5%        | 1/6W   |
| R422    | 1-247-879-00  | CARBON           | 100K  | 5%        | 1/6W   |
| R423    | 1-247-831-00  | CARBON           | 1K    | 5%        | 1/6W   |
| R424    | 1-247-879-00  | CARBON           | 100K  | 5%        | 1/6W   |
| R425    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R426    | 1-247-859-00  | CARBON           | 15K   | 5%        | 1/6W   |
| R427    | 1-247-831-00  | CARBON           | 1K    | 5%        | 1/6W   |
| R428    | 1-247-831-00  | CARBON           | 1K    | 5%        | 1/6W   |
| R429    | 1-247-831-00  | CARBON           | 1K    | 5%        | 1/6W   |
| R430    | 1-247-831-00  | CARBON           | 1K    | 5%        | 1/6W   |
| R431    | 1-247-832-00  | CARBON           | 1.1K  | 5%        | 1/6W   |
| R432    | 1-249-419-11  | CARBON           | 1.5K  | 5%        | 1/6W   |
| R433    | 1-249-419-11  | CARBON           | 1.5K  | 5%        | 1/6W   |
| R434    | 1-247-831-00  | CARBON           | 1K    | 5%        | 1/6W   |
| R437    | 1-249-432-11  | CARBON           | 18K   | 5%        | 1/6W   |
| R438    | 1-247-795-00  | CARBON           | 33    | 5%        | 1/6W   |
| R439    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R440    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R441    | 1-247-857-00  | CARBON           | 12K   | 5%        | 1/6W   |
| R442    | 1-249-425-11  | CARBON           | 4.7K  | 5%        | 1/6W   |
| R443    | 1-247-809-00  | CARBON           | 120   | 5%        | 1/6W   |
| R444    | 1-247-833-00  | CARBON           | 1.2K  | 5%        | 1/6W   |
| R445    | 1-247-869-00  | CARBON           | 39K   | 5%        | 1/6W   |
| R446    | 1-247-873-00  | CARBON           | 56K   | 5%        | 1/6W   |
| R447    | ▲1-217-391-00 | FUSIBLE          | 22    | 5%        | 1/4W F |
| R448    | 1-249-421-11  | CARBON           | 2.2K  | 5%        | 1/6W   |
| R501    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R502    | 1-247-903-00  | CARBON           | 1M    | 5%        | 1/6W   |
| R503    | 1-247-841-00  | CARBON           | 2.7K  | 5%        | 1/6W   |
| R504    | 1-247-879-00  | CARBON           | 100K  | 5%        | 1/6W   |
| R505    | 1-249-432-11  | CARBON           | 18K   | 5%        | 1/6W   |
| R506    | 1-249-425-11  | CARBON           | 4.7K  | 5%        | 1/6W   |
| R507    | 1-249-433-11  | CARBON           | 22K   | 5%        | 1/6W   |
| R601    | 1-247-809-00  | CARBON           | 120   | 5%        | 1/6W   |
| R602    | 1-249-429-11  | CARBON           | 10K   | 5%        | 1/6W   |
| R603    | 1-247-867-00  | CARBON           | 33K   | 5%        | 1/6W   |
| RV101   | 1-228-995-00  | RES, ADJ, CARBON | 22K   |           |        |
| RV102   | 1-228-994-00  | RES, ADJ, CARBON | 10K   |           |        |
| RV201   | 1-228-995-00  | RES, ADJ, CARBON | 22K   |           |        |
| RV202   | 1-228-994-00  | RES, ADJ, CARBON | 10K   |           |        |
| RY301   | 1-515-535-11  | RELAY            |       |           |        |

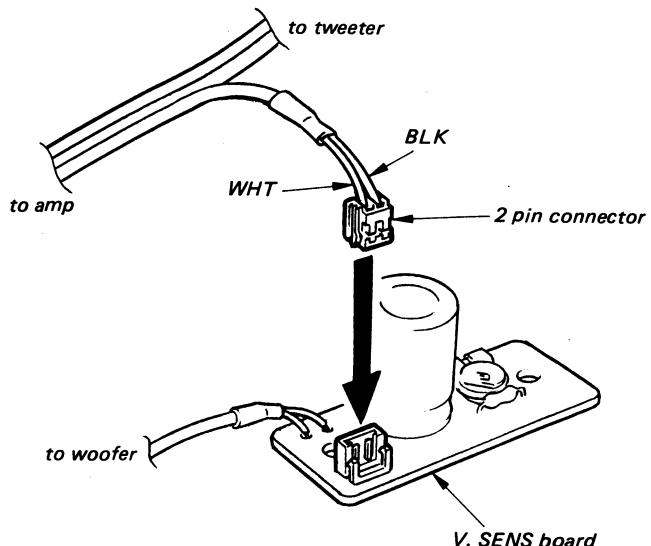
ELECTRICAL PARTS

| <u>Ref.No.</u> | <u>Part No.</u> | <u>Description</u>                  |
|----------------|-----------------|-------------------------------------|
| S1             | 1-554-691-00    | SWITCH, SLIDE (DOLBY NR)            |
| S2             | 1-554-691-00    | SWITCH, SLIDE (TIMER)               |
| S3             | 1-514-674-21    | SWITCH, SLIDE (DIRECTION)           |
| S301           | 1-554-277-00    | SWITCH, SLIDE (ISS)                 |
| S601           | 1-553-856-00    | SWITCH, KEY BOARD (STOP)            |
| S602           | 1-553-856-00    | SWITCH, KEY BOARD (REW)             |
| S603           | 1-553-856-00    | SWITCH, KEY BOARD (FF)              |
| S604           | 1-553-856-00    | SWITCH, KEY BOARD (FWD)             |
| S605           | 1-553-856-00    | SWITCH, KEY BOARD (REV)             |
| S606           | 1-553-856-00    | SWITCH, KEY BOARD (PAUSE)           |
| S607           | 1-553-856-00    | SWITCH, KEY BOARD (REC)             |
| S608           | 1-553-856-00    | SWITCH, KEY BOARD (REC MUTE)        |
| S609           | 1-553-856-00    | SWITCH, KEY BOARD (AMS)             |
| S801           | 1-554-883-11    | SWITCH, SLIDE (DIRECTION)           |
| S802           | 1-553-856-00    | SWITCH, KEY BOARD (HALF DET)        |
| S803           | 1-553-856-00    | SWITCH, KEY BOARD (70/120 U)        |
| S804           | 1-553-856-00    | SWITCH, KEY BOARD (METAL)           |
| S805           | 1-553-856-00    | SWITCH, KEY BOARD (ERASE PROOF/FWD) |
| S806           | 1-553-856-00    | SWITCH, KEY BOARD (ERASE PROOF/REV) |
| SPK101         | 1-235-186-00    | ENCAPSULATED COMPONENT              |
| SPK201         | 1-235-186-00    | ENCAPSULATED COMPONENT              |
| T301           | 1-433-281-11    | TRANSFORMER, BIAS OSCILLATOR        |
| X501           | 1-527-532-00    | OSCILLATOR, CERAMIC                 |

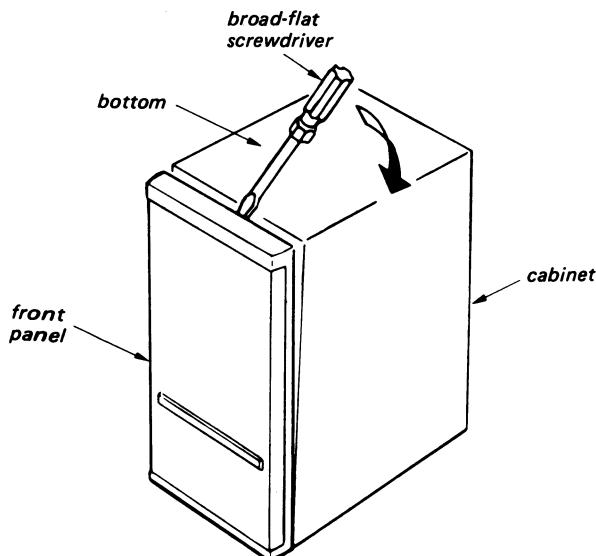
# SPEAKER SYSTEM [APM-177M]

## [NOTES ON REPLACING WOOFER UNIT AND V. SENS BOARD]

- As woofer unit and V. SENS board (fixed on rear plate of speaker cabinet) are supplied as a block, replace them at the same time. Be sure to discard former V. SENS board. After replacing, there is no problem even if V. SENS board gets out of fixed position a little.
- Adjustable resistor (RV101) on V. SENS board has already adjusted with woofer unit. Therefore do not adjust it.
- Be sure to insert 2 pin connector as illustrated on the right.

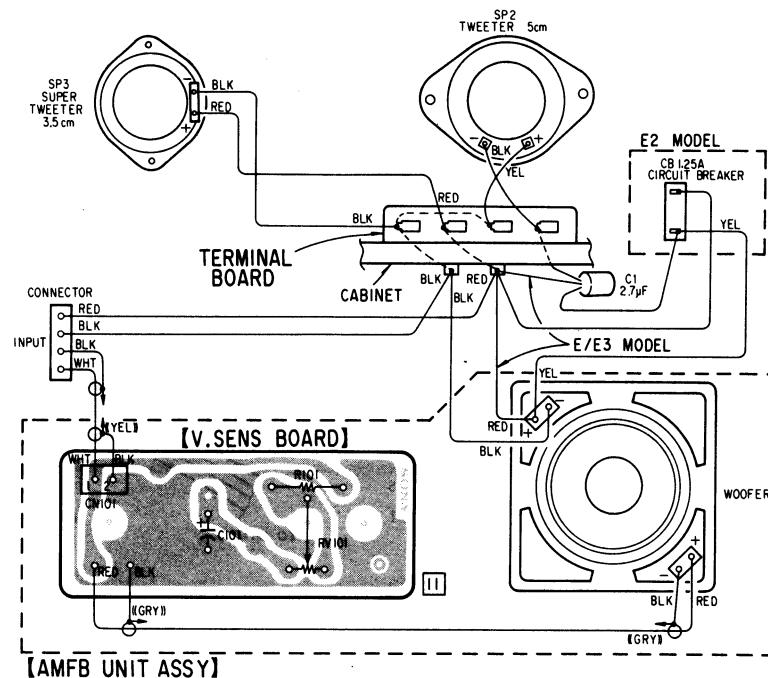


## 1. DISASSEMBLY FRONT PANEL REMOVAL



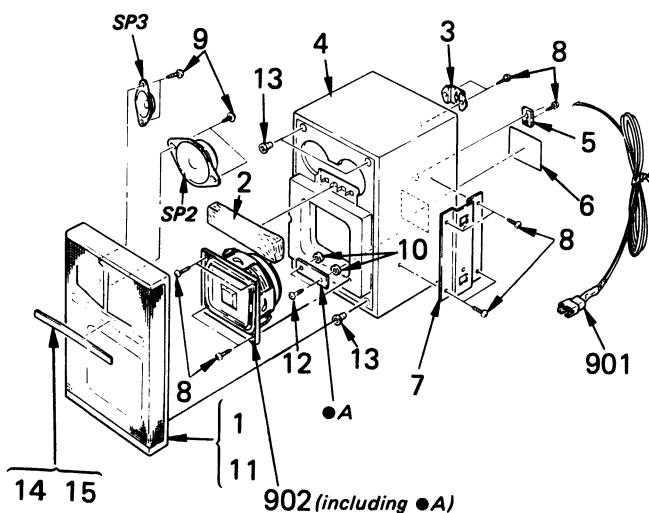
Note: Be careful not to scratch the cabinet.

**2. WIRING DIAGRAM**



Note: Volume (RV101) cannot be replaced.

**3. EXPLODED VIEW AND PARTS LIST**



| No. | Part No.      | Description                   | Remarks |
|-----|---------------|-------------------------------|---------|
| 1   | X-4910-067-1  | PANEL (LEFT) ASSY (B), FRONT  |         |
| 2   | *4-910-045-01 | ABSORBENT (C), ACOUSTIC       |         |
| 3   | *4-883-959-01 | HOOK                          |         |
| 4   | X-4910-046-1  | CABINET ASSY, SPEAKER         |         |
| 5   | *4-914-306-01 | CLAMP                         |         |
| 6   | *4-910-397-01 | (E)...LABEL, MODEL NUMBER     |         |
|     | *4-914-311-01 | (E2)...LABEL, MODEL NUMBER    |         |
|     | *4-914-312-01 | (E3)...LABEL, MODEL NUMBER    |         |
| 7   | *4-902-981-11 | PLATE (B), SIDE               |         |
| 8   | 4-874-614-11  | SCREW (4)(3.5X14), TAPPING    |         |
| 9   | 7-685-646-71  | SCREW +BVTP 3X8 TYPE2 SLIT    |         |
| 10  | 4-846-456-02  | FOOT, FELT                    |         |
| 11  | X-4910-068-1  | PANEL (RIGHT) ASSY (B), FRONT |         |
| 12  | 7-685-148-01  | SCREW +P 3X12 TYPE1           |         |
| 13  | *4-872-922-02 | CATCHER                       |         |
| 14  | 4-914-332-01  | PLATE (LEFT), ORNAMENTAL      |         |
| 15  | 4-914-331-01  | PLATE (RIGHT), ORNAMENTAL     |         |

ELECTRICAL PARTS

| Ref.No. | Part No.                     | Description                                       |
|---------|------------------------------|---|
| 901     | 1-558-469-11                 | CORD, SPEAKER                                     |
| 902     | X-4910-076-1<br>X-4910-077-1 | (E).....AMFB UNIT ASSY<br>(E2/3)...AMFB UNIT ASSY |
| C1      | 1-123-545-00                 | ELECT 2.7MF 20% 50V                               |
| C101    | 1-123-311-00                 | CAP, ELECT 1000MF                                 |
| CB      | 1-532-664-00                 | (E2)...CIRCUIT BREAKER , 1.25A                    |
| R101    | 1-247-698-11                 | RES, CARBON 68                                    |
| SP2     | 1-503-590-11                 | SPEAKER (5CM CONE TYPE)                           |
| SP3     | 1-503-591-11                 | SPEAKER (3.5CM)                                   |